

October 4, 2002

CTC/DP-CL3673-02

U.S. Army Environmental Center
ATTN: SFIM-AEC-PCT
5179 Hoadley Road
Aberdeen Proving Ground, MD 21010-5401

SUBJECT: Draft Program Management Plan and Draft Work Breakdown Structure
(CDRL A001), dated October 3, 2002

REFERENCE: (1) Task No.: 307 "Unexploded Ordnance (UXO), approved September
5, 2002
(2) Contract Number DAAE30-98-C-1050

Dear Sir:

Concurrent Technologies Corporation (CTC) is pleased to submit one (1) copy of the Subject Deliverable in accordance with the Reference (1) Task under the Reference (2) Contract. If you should require technical clarification, please call the Associate Manager, Process Engineer, at (814) 269-2772. For contractual issues, please call the undersigned at the above direct dial number.

Very truly yours,

// Original Signed //

Manager, Contract Resources

/bem

Enclosures: as stated

cc: SFIM-AEC-ETT
CSTE-DTC-AT-TC-M
SFIM-AEC-ETD

UNEXPLODED ORDNANCE (UXO) TASK

Draft Program Management Plan and Draft Work Breakdown Structure

October 3, 2002

Requests for this document shall be referred to:

Office, Assistant Secretary of the Army
ASA (I&E) ESOH
1235 Jefferson Davis Highway
Crystal Gateway 1
Suite 307
Arlington, VA 22202-5819

Contract No. DAAE30-98-C-1050
Task No. 307
CDRL No. A001

*Prepared by
National Defense Center for Environmental Excellence (NDCEE)*

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- Appendix C: List of Personnel

ACRONYM LIST

AERTA	Army Environmental Requirements and Technology Assessments
AFB	Air Force Base
AFRL/MLQ	Air Expeditionary Forces Technologies Division
ASTD	Accelerate Site Technology Deployment
AUTM	Association of University Technology Managers
BRAC	Base Realignment and Closure
CDRL	Contract Data Requirement List
CERCLA	Comprehensive Environmental, Response, Compensation, and Liability Act
CTC	Concurrent Technologies Corporation
DACA	Days After Contract Award
DENIX	Defense Environmental Network & Information eXchange
DDESB	Department of Defense Explosives Safety Board
DOE	Department of Energy
DOD	Department of Defense
DTIC	Defense Technical Information Center
DQOs	Data Quality Objectives
ECAM	Environmental Cost Analysis Methodology
EIA	Environmental Information Analysis
EM	Electromagnetic
EM	Engineers Manual
EMI	Electromagnetic induction
EPA	Environmental Protection Agency
ESTCP	Environmental Security Technology Certificate Program
FFRRO	Federal Facilities Restoration and Reuse Office
FLC	Federal Laboratory Consortium
FUDS	Formerly Used Defense Site
GWRTAC	Ground Water Remediation Technology Analysis Center
HTRW	Hazardous, Toxic and Radioactive Waste
ID	Identify
IPR	In Progress Review
ITRC	Interstate Technology Regulatory Council
ITSR	Innovative Technology Summary Report
JUXOCO	Joint Unexploded Ordnance Coordination Office
LUCs	Land Use Controls
MACA	Months After Contract Award
MCX	Mandatory Center of Excellence
NAOC	National Association of Ordnance and Explosive Waste Contractors
NAVEOD	U.S. Navy Explosive Ordnance Disposal
NAVEODTECHDIV	Naval Explosive Ordnance Disposal Technology Division
NAVSCOLEOD	Naval School Explosive Ordnance Disposal
NDCEE	National Defense Center for Environmental Excellence
NJDEP	New Jersey Department of Environmental Protection
NLT	No Later Than
OE	Ordnance and Explosives

OEW	Ordnance and Explosive Waste
OPM-MCD	Office of the Program Manager for Mines, Countermine and Demolitions
OSHA	Occupational Safety and Health Administration
PMP	Program Management Plan
POC	Point of Contact
PPE	Personal Protective Equipment
PVC	Polyvinyl Chloride
QA	Quality Assurance
QC	Quality Control
RCRA	Resource Conservation and Recovery Act
RDT&E	Research, Development, Testing, and Evaluation
SBA	Small Business Administration
SBIR	Small Business Innovative Research
SERDP	Strategic Environmental Research and Development Program
SOP	Standard Operating Procedure
SOW	Statement of Work
STTR	Small Business Technology Transfer
TBD	To Be Determined
TSWG	Technical Support Working Group
USACE	United States Army Environmental Center
USAEC	United States Army Corps of Engineers
USGS	United States Geological Survey
UXO	Unexploded Ordnance
UXOCOE	Unexploded Ordnance Center of Excellence
WBS	Work Breakdown Structure
WES	Waterways Experimental Station
YPG	Yuma Proving Ground

1.0 INTRODUCTION

1.1 Program Management Plan

This Program Management Plan (PMP) provides technical, management, schedule, and cost data associated with Task No. 307, Unexploded Ordnance Task. It describes the approach, resources, and processes by which the contractor, Concurrent Technologies Corporation (*CTC*) through the National Defense Center for Environmental Excellence, will establish and execute the project described in the Work Breakdown Schedule (WBS) and Task Descriptions of this PMP. The UXO Task will address the Army's UXO issues by documenting state-of-the-art technologies, identifying data gaps, testing technologies and their effects on various UXO, and investigating subsurface movement of UXO. The ultimate objective is to expand the DOD's knowledge base and capabilities while improving mission readiness for safely and cost-effectively remediating UXO.

This document is submitted in fulfillment of Contract Data Requirements List (CDRL) A001, Program Management Plan (PMP) and Work Breakdown Structure (WBS) for the National Defense Center for Environmental Excellence (NDCEE) Contract DAAE30-98-C-1050, Task No. 307, UXO. The resource plan for labor resources is based upon the WBS discussed in Section 2.0 that was prepared in accordance with CDRL A001 of the Statement of Work (SOW). The resource plan addresses each month of the project.

Project management is discussed in this PMP. An organization chart identifying the names of *CTC* personnel, their roll/task responsibility, and their involvement in Task No. 307 is provided in Section 3.0. In addition, Section 3.0 also contains a personnel contact table, which will be updated to include Government stakeholders once they have been identified by the Technical Monitor, in accordance with the SOW. A deliverables table and projected schedule have been provided in Sections 4.0 and 5.0 respectively, of this document. These items identify project milestones, projected start dates, and projected completion dates.

This PMP also describes the organization, practices, and techniques that will be used to manage the project. The main document addresses the overall task-level and subtask-level schedules and resources that are required to perform this work. Appendix A provides the detailed work unit descriptions that are required to accomplish the SOW. A project risk assessment and risk management plan was developed and is included in Section 12.0.

1.2 Contract Data

Client	Defense Contracts Command-Washington
Contract Start Date	September 5, 2002
Contract Number	DAAE30-98-C-1050
Task No.	307

Contract Type
Completion Date

Cost Plus Fixed Fee
September 30, 2003

1.3 Project Summary

The presence of Unexploded Ordnance (UXO) on military bases and military training lands, as well as former and active combat zones, has significant impact on military readiness. The inability to effectively, safely, and cost-effectively identify, characterize and remediate UXO in both peacetime and combat situations also has potential adverse impact on the health and safety of military and non-military personnel along with the quality of our environment.

Millions of acres of property in the U.S. and abroad contain UXO. Some of these UXO sites are a result of U.S. military training activities and weapon system testing, while other sites contain UXO as a result of combat operations. The UXO 2001 Report to Congress estimates that over 11 million acres of property in the U.S. may be contaminated with UXO. This includes approximately 763 Formerly Used Defense Sites (FUDS), and 23 Base Realignment and Closure (BRAC) installations, which must be cleared of UXO for Department of Defense (DOD) reuse or civilian use, in addition to other sites requiring restricted access. A combination of political, regulatory and budgetary drivers forces the need to improve the DOD's ability to more effectively remediate UXO sites.

1.4 Statement of Work

See Appendix B for the complete SOW, dated July 12, 2002, and corresponding CDRLs.

2.0 WORK BREAKDOWN STRUCTURE

As part of the PMP, a Work Breakdown Structure (WBS) was developed and is shown in Figure 1. Upon approval of the PMP by the Government, the associated WBS will serve as a basis for program and technical planning, scheduling, cost estimating, resource allocation, performance management, configuration management, and status reporting. The WBS will be updated as required to correspond with necessary changes in program execution, and modifications will be explained in the monthly reports. All changes in the WBS will require Government approval prior to execution.

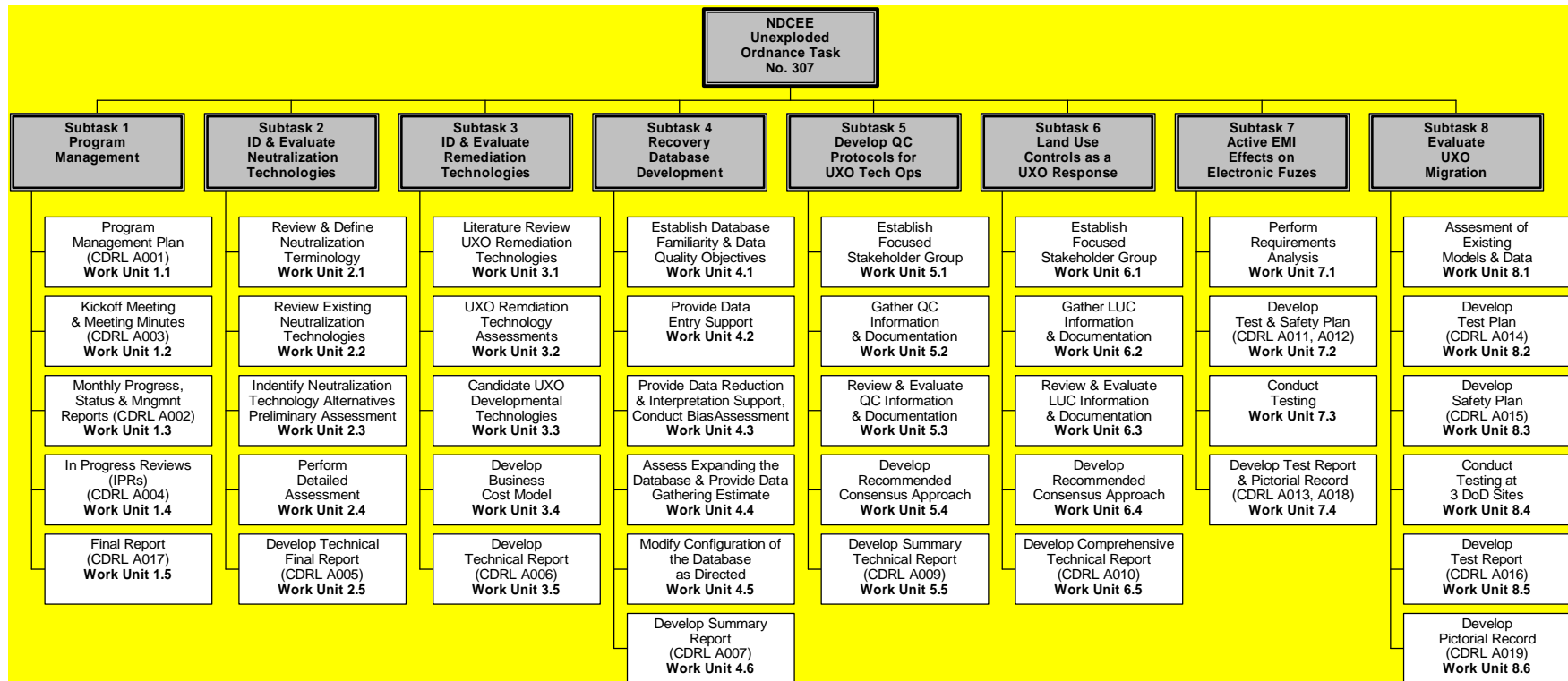


Figure 1. WBS for UXO Task No. 307

3.0 TASK ORGANIZATIONAL STRUCTURE

3.1 CTC UXO Team

The UXO task will be completed by the *CTC* UXO Team under the direction of the Director for Advanced Applications. The NDCEE Program Manager, will provide senior management overview. Subtask leaders, senior technical advisors, a business analyst, and administrative assistant will assist with the day-to-day program management, technical, financial, and administrative operations. The Task Management Organizational Chart is shown in Figure 2. In addition, a dedicated staff of specialized personnel will conduct work within the subtasks using the *CTC* matrix management system. Background descriptions of *CTC* personnel are provided in Appendix C List of Personnel.

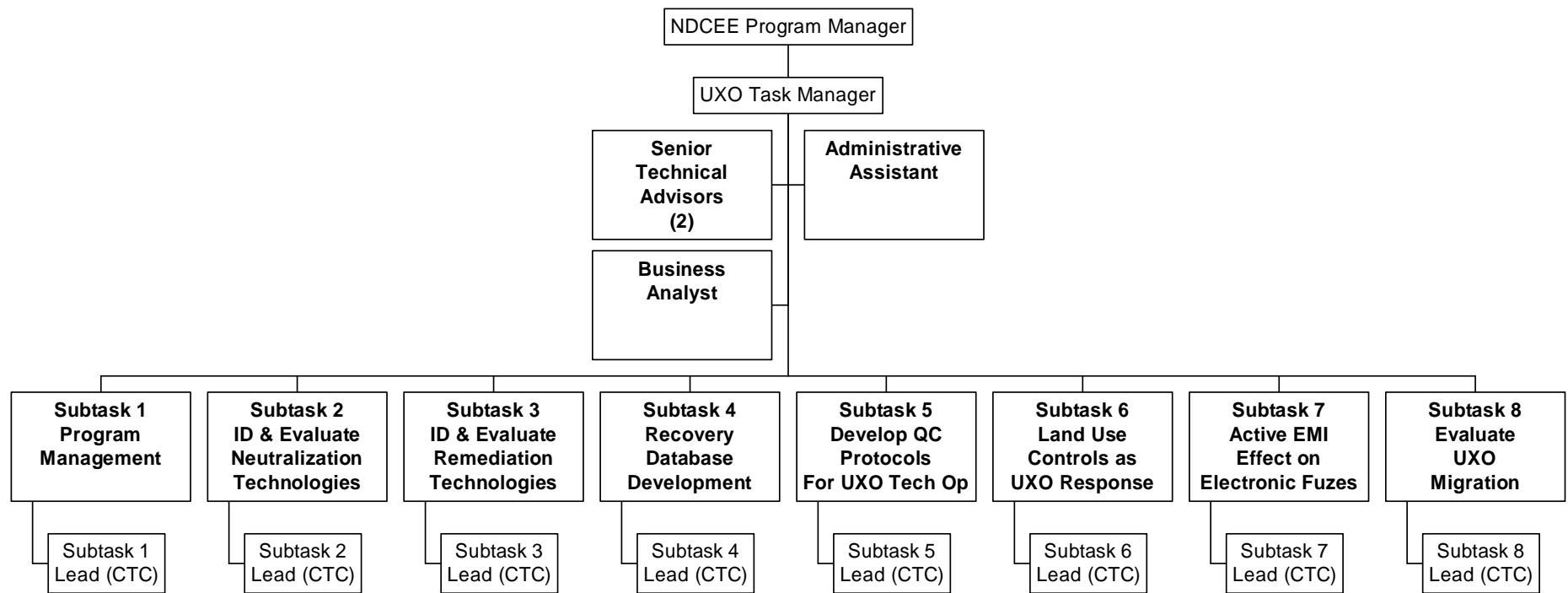


Figure 2. UXO Task No. 307 Organizational Chart

3.2 Task Communication

All subtask leads will have direct control and authority over the daily management activities for their subtask, including management of their subtask team and discussions with Government stakeholders. The subtask leads will directly report to the Project Manager. He will then directly report to the NDCEE Program Manager and the UXO Task Technical Monitor. Preliminary task personnel contact information is provided in Table 1.

Table 1. Task Personnel Contact Information

Task Responsibility (Organization)	Phone
Technical Monitor (USAEC)	(410) 436-6865
NDCEE Program Manager (<i>CTC</i>)	(814) 269-2877
Project Manager (<i>CTC</i>)	(814) 269-2810
Government Project Stakeholders	TBD
Technical Advisor (<i>CTC</i>)	(850) 833-9350
Technical Advisor (<i>CTC</i>)	(727) 549-7006
Technical Advisor (<i>CTC</i>)	(814) 269-6439
Business Analyst (<i>CTC</i>)	(814) 269-2793
Subtask 1 & 4 Lead (<i>CTC</i>)	(814) 269-6834
Subtask 2 Lead (<i>CTC</i>)	1-888-226-5962
Subtask 3 Lead (<i>CTC</i>)	(303) 297-0180 ext. 116
Subtask 5 Lead (<i>CTC</i>)	(814) 269-6255
Subtask 6 Lead (<i>CTC</i>)	(814) 269-6455
Subtask 7 Lead (<i>CTC</i>)	(843) 744-2829
Subtask 8 Lead (<i>CTC</i>)	(619) 725-5014
Government Subtask Stakeholders	TBD

*TBD = to be determined

3.3 Government Stakeholders

The UXO Task Technical Monitor (USAEC) will designate and provide Points-of-Contact (POCs) to NDCEE for invitation onto the UXO Project Team. Invitees' will included but not be limited to, Government representatives from the following organizations:

- U.S. Army Environmental Center (USAEC), Aberdeen Proving Ground, Maryland
- U.S. Navy Explosives Ordnance Disposal (NAVEOD) Technology Division, Indian Head, Maryland
- U.S. Air Force Research Laboratory, Tyndall AFB, Florida
- U.S. Army Corps of Engineers (USACE), Huntsville, Alabama
- U.S. Army Corps of Engineers (USACE) Waterways Experimental Station (WES), Vicksburg, Mississippi
- Technical Support Working Group (TSWG) for NDCEE.

Invitations will be tendered to the designated POCs to join the UXO Project Team to provide guidance, expertise, and DoD-wide synergy during the execution of the project.

4.0 ITEMS/DATA TO BE DELIVERED

NDCEE will deliver all items and data (contract deliverables) as specified in Table 2 of this PMP in accordance with the Government's SOW. The delivery schedule is based on the contract award date, September 5, 2002. Deliverables will document the specific technical parameters used for measuring the technical progress of this project. Ten working days have been allotted by NDCEE in the appropriate Subtask schedules, for Government review of test and safety plans.

Table 2. UXO Task 307 Contract Deliverables

Item	Subtask	SOW Paragraph	CDRL Number	Date Due	Calendar Date (Based on 9/5/02)
Program Management Plan	1	3.1	A001	30 DACA*	Saturday October 5, 2002
Monthly Progress, Status, and Management Reports	1	3.2	A002	Day 15 of each month throughout the life of this Project	Day 15 of each month throughout the life of this Project
Kick-off Meeting Minutes/ Meeting Minutes	1	3.3	A003	45 DACA	Sunday October 20, 2002
In Progress Review (IPR)	1	3.3	A004	4 Months after award	December 2002
Second In Progress Review (IPR)	1	3.3	A004	4 Months after first IPR	April 2003
Third In Progress Review (IPR)	1	3.3	A004	5 Months after second IPR	September 2003
Technical Report – UXO Neutralization Technologies	2	3.4	A005	360 DACA	Sunday August 31, 2003
Technical Report – UXO Remediation Technologies	3	3.5	A006	360 DACA	Sunday August 31, 2003
Summary Technical Report (UXO Recovery Database)	4	3.6	A007	360 DACA	Sunday August 31, 2003
Not Used		Not Used	A008	Not Used	Not Used
Technical Report (Quality Control Protocols)	5	3.9	A009	360 DACA	Sunday August 31, 2003
Technical Report (Land Use Controls)	6	3.10	A010	360 DACA	Sunday August 31, 2003
Test Plan (EMI Testing)	7	3.12	A011	90 DACA	Wednesday December 4, 2002
Safety Plan (EMI Testing)	7	3.12	A012	90 DACA	Wednesday December 4, 2002
Test Report (EMI Testing)	7	3.12	A013	60 days after completion of testing	TBD
Test Plan (UXO Migration)	8	3.13	A014	60 DACA	Monday November 4 , 2002
Safety Plan (Migration)	8	3.13	A015	60 DACA	Monday November 4 , 2002
Test Report (Migration)	8	3.13	A016	60 days after completion of testing	TBD
Final Report	1	3.14	A017	390 DACA	Tuesday September 30, 2003
Pictorial Record /PPT Presentation (EMI)	7	3.12	A018	60 days after completion of testing	TBD
Pictorial Record /PPT Presentation (Migration)	8	3.13	A019	60 days after completion of testing	TBD

* DACA – days after contract award

Note: Due dates that occur on a weekend will be delivered the prior Friday.

5.0 PERIOD OF PERFORMANCE

The period of performance for the NDCEE UXO Task No. 307 is 390 calendar days after contract award (DACA). The completion date of this effort corresponds to the NDCEE Contract end date of September 30, 2003. A summary of the task schedule is shown in Figure 3. The schedules for each individual subtask are contained within Sections 6.1 through 6.8 of this document within their respective subtask descriptions.

Task Schedule

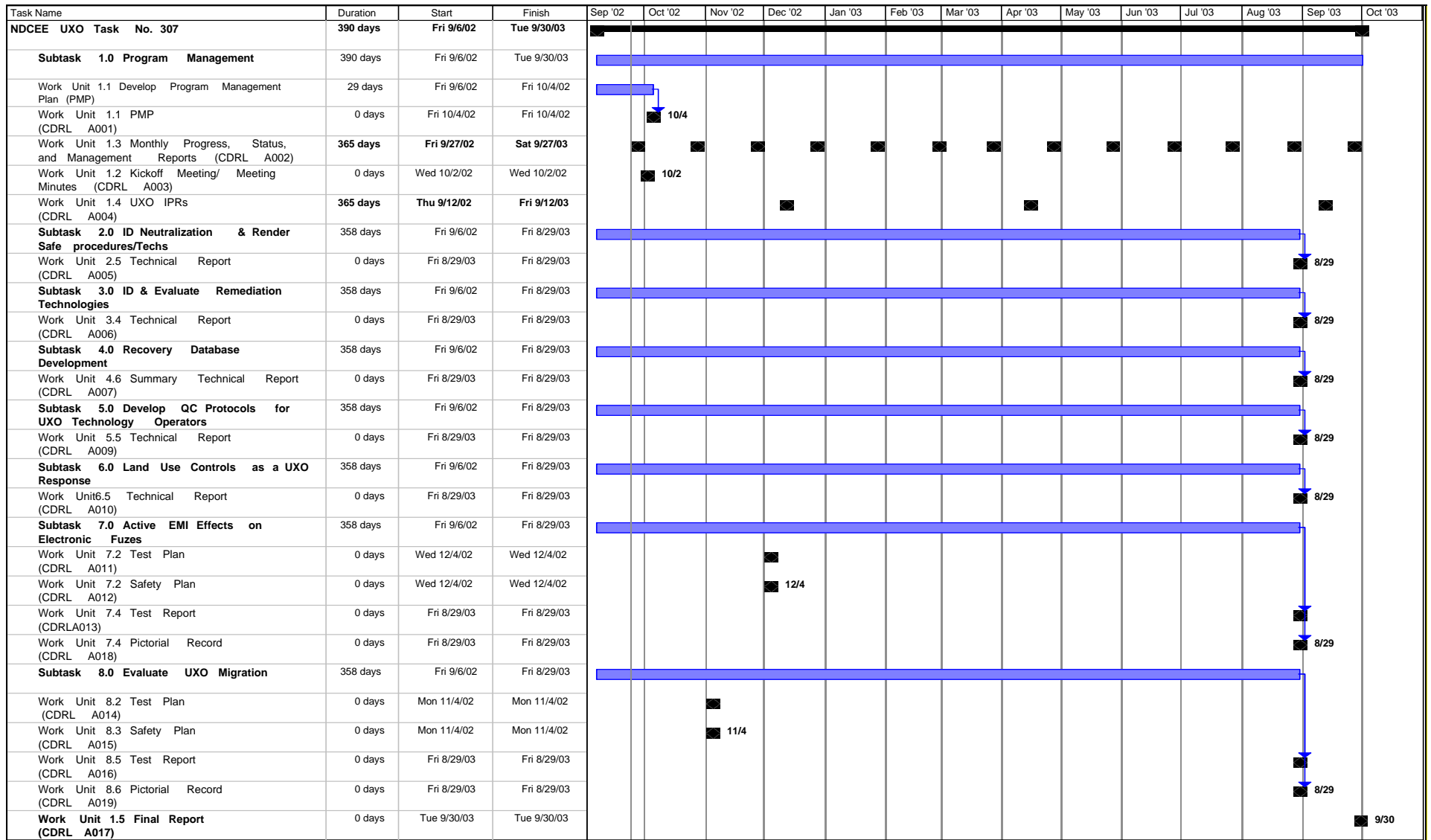


Figure 3. UXO Task No. 307 Schedule

Table 3. Resources Table for the UXO Task

Concurrent Technologies Corporation Contract No. DAAE30-98-C-1050 Task 307 Unexploded Ordnance														
Description	Total Proposed	Sep-02	Oct-02	Nov-02	Dec-02	Jan-03	Feb-03	Mar-03	Apr-03	May-03	Jun-03	Jul-03	Aug-03	Sep-03
Level of Effort (Hours)														
Professional Level 5	1,952	183	190	120	152	121	136	114	144	120	121	133	113	309
Professional Level 4	7,923	651	963	615	604	529	413	335	577	649	615	626	660	688
Professional Level 3	6,161	437	477	441	720	555	456	428	501	378	422	459	468	422
Professional Level 2	990	41	103	127	126	114	98	52	64	59	55	49	68	36
Professional Level 1	4,242	247	304	294	362	303	335	411	440	322	326	448	280	172
Technician Level 3	1,200	0	40	144	136	0	0	0	40	140	160	304	200	36
Technician Level 2	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Technician Level 1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Administrative Level 2	3,133	219	260	230	230	199	211	237	278	216	214	264	278	300
Administrative Level 1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Hours	25,600	1,778	2,336	1,970	2,328	1,819	1,647	1,576	2,044	1,883	1,912	2,283	2,066	1,962

6.0 TASK DESCRIPTIONS

The UXO Task is divided into a single program management task and seven technical subtasks: 1) Program Management, 2) Identify and Evaluate Neutralization Technologies, 3) Identify and Evaluate Remediation Technologies, 4) Recovery Database Development, 5) Develop QC Protocols for UXO Technology Operators, 6) Land Use Controls as a UXO Response, 7) Active EMI Effects on Electronic Fuzes, and 8) Evaluate UXO Migration. These subtasks are described briefly in the following paragraphs.

6.1 Subtask 1 Program Management

Subtask 1 Program Management provides dedicated personnel with commensurate experience in conjunction with accepted financial and management control activities required to properly manage the NDCEE UXO Task. Subtask 1 is further divided into the five following work units to accomplish the required functions (SOW Sections 3.1 to 3.3):

- Develop a Program Management Plan (PMP) to act as the Technical and Management work plan, in accordance with CDRL A001,
- Manage the technical, cost, and schedule approach to accomplish the SOW
 - Systematic interfacing with the Government
 - Management and coordination of all Subtasks
- Complete a kickoff meeting with an experienced Project Team, including Government stakeholders, and submit meeting minutes for review and approval, in accordance with CDRL A003
- Prepare monthly reports, in accordance with CDRL A002, to document project progress
- Conduct and host three In Progress Reviews (IPRs)
- Submit a summary final report, in accordance with CDRL A017.

The Work Units for Subtask 1 are shown in Figure 6 and are described in more detail below.

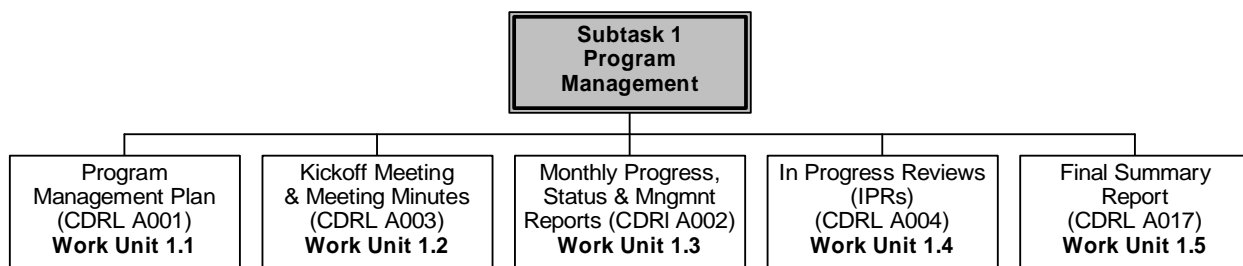


Figure 4. Subtask 1 WBS

Program Management Plan (PMP)

The NDCEE has prepared and developed this Program Management Plan (PMP), in accordance with CDRL A001 (DI-MGMT-81117), which addresses the activities and associated milestones required by the SOW and describes the management approach to executing and controlling this task. It includes and describes specific management plans and controls, technical approaches to be taken, the corresponding levels of effort required for each subtask, a project schedule with milestones, risk management, and a projected expenditure curve. This PMP contains a project organization chart depicting the names, types and the expertise of personnel assigned to each task, including contractor personnel and their involvement in the task.

This PMP includes a Contract Work Breakdown Structure (CWBS) that indicates resources and project tasks, which serve as a basis for program and technical planning, scheduling, cost estimating, resource allocation, performance management, configuration management, and status reporting. A Gantt chart that defines each project phase, schedules, and deliverables will also be included. The PMP will be revised and updated, as required, to correspond with necessary changes in task execution. Any leasing of equipment, or changes in cost, schedule or scope of the SOW that were not included in the approved proposal will require written approval from the Government prior to initiation. This PMP is considered a working document, subject to change as necessary.

This Draft PMP has been prepared and submitted to the Government within 30 days after contract award (DACA) and the Government will have up to 30 days to review and comment. The Final PMP will be submitted 30 days after receipt of Government comments on the Draft PMP.

Kickoff Meeting

To ensure timely execution of task activities and to accomplish the requirements of the SOW, NDCEE will conduct a task kickoff meeting with Project Team members, including but not limited to, Government representatives from the following organizations:

- U.S. Army Environmental Center (USAEC), Aberdeen Proving Ground, Maryland
- U.S. Navy Explosives Ordnance Disposal (NAVEOD) Technology Division, Indian Head, Maryland
- U.S. Air Force Research Laboratory, Tyndall AFB, Florida
- U.S. Army Corps of Engineers (USACE), Huntsville, Alabama
- U.S. Army Corps of Engineers (USACE) Waterways Experimental Station (WES), Vicksburg, Mississippi

- Technical Support Working Group (TSWG) for NDCEE.

The USAEC Technical Monitor will designate and provide Points-of-Contact (POCs) to NDCEE from the aforementioned organizations, who will be contacted and invited to participate as a member of the UXO Project Team. These subject matter experts, along with the Contracting Officer's Representative (COR) and the USAEC Technical Monitor, will provide guidance and an experienced resource base for accomplishing the requirements of the SOW.

The Kickoff Meeting is proposed to be held at the NDCEE facility in Johnstown, Pennsylvania within 30 DACA. Within 15 days following the meeting, the NDCEE will prepare and distribute minutes of this meeting for review and approval, in accordance with CDRL A003 (DI-ADMIN-81505). Also, the NDCEE will actively participate in UXO related information exchanges, including the 2002 UXO Countermine Forum, the 2002 ESCTP/SERDP Technical Symposium and Workshop, and an ITRC UXO Meeting.

In addition to maximize team communication, the NDCEE will prepare and distribute minutes of all related UXO Task face-to-face meetings and teleconferences conducted during the period of performance (POP). Also, biweekly teleconferences will be held with the UXO Project Team to ensure timely dissemination of task information among the team members.

Monthly Progress, Status and Management Reports

The NDCEE will prepare and submit to the Government, by the 15th day of each month, a report that describes task activities for the previous month and anticipated activities for the upcoming month, and compares the current status of the actual task costs and progress to the proposed task schedule and resources. This report will specifically contain the following information:

- Schedule, technical, travel and cost status
- Highlights of work planned by NDCEE during this period
- Discussions of any problems or obstacles encountered and the actions taken to remedy the situation
- Highlights of work planned by the contractor for the next reporting period.

The NDCEE will submit this report to the Government, in accordance with CDRL A002 (DI-MGMT-80227), in both hard copy and electronic format using Microsoft Word.

In Progress Review (IPRs)

The NDCEE will coordinate three UXO In Progress Reviews (IPRs) during POP of this Task. The first IPR will take place approximately four months after

contract award (MACA), the second IPR will take place approximately four months after the first IPR, and the third IPR shall take place approximately five months after the second IPR. The IPRs are scheduled to be held via teleconference/telephone and will allow for the participation of primary technical personnel. The NDCEE will prepare a comprehensive status report for presentation at each IPR, in accordance with CDRL A004. Specifically, quad charts will be prepared for the overall UXO Task and each Subtask, which will be accompanied by additional slides, if necessary, to provide additional information (e.g., resource curves, detailed Gantt charts with subtask work percentage complete, products/ milestones, accomplishments, etc.). The UXO Task will also be briefed at NDCEE level 1 and level 3 program reviews.

Final Summary Report

The NDCEE will prepare a Final Summary Report for all activities conducted under this effort within 390 DACA, in accordance with CDRL A017. The report will include a brief summary of all subtasks and accomplishments, data summary, lessons learned, costs, and conclusions and recommendations. In addition, the final reports for each subtask will be included in the Final Summary Report as appendices.

Subtask 1 Schedule

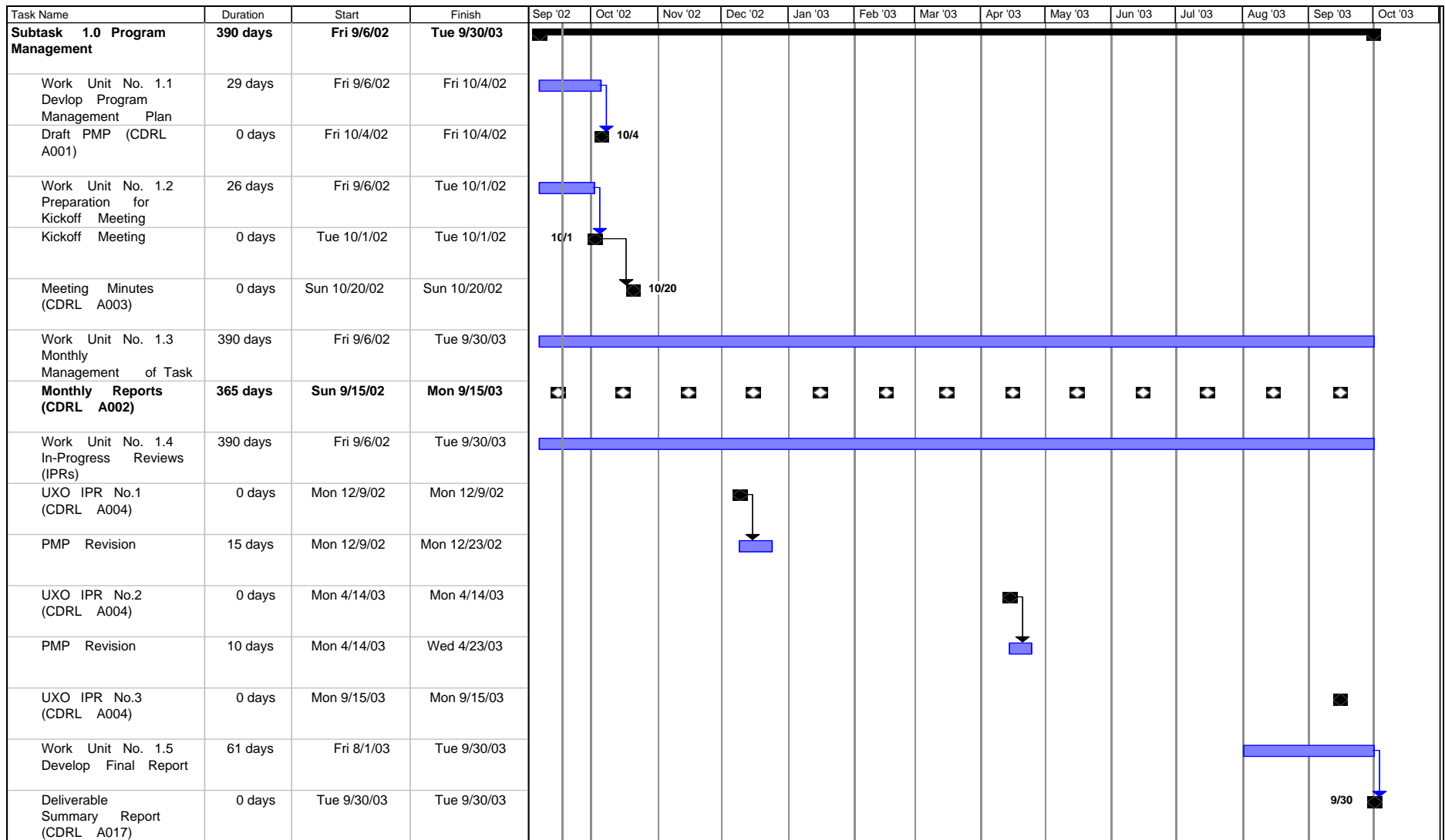


Figure 5. Schedule for Subtask 1 Program Management

Table 4. Resources Table for Subtask 1 Program Management

Task 307 Unexploded Ordnance - Program Management														
Description	Total Proposed	Sep-02	Oct-02	Nov-02	Dec-02	Jan-03	Feb-03	Mar-03	Apr-03	May-03	Jun-03	Jul-03	Aug-03	Sep-03
Level of Effort (Hours)														
Professional Level 5	573	84	63	22	54	22	46	22	54	22	22	22	30	110
Professional Level 4	72	8	10	2	10	2	2	2	10	2	2	2	2	18
Professional Level 3	617	89	53	25	57	25	57	25	57	25	25	25	33	121
Professional Level 2	160	24	8	8	16	8	16	8	16	8	8	8	8	24
Professional Level 1	596	88	48	20	52	20	52	20	52	20	20	20	36	148
Technician Level 3	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Technician Level 2	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Technician Level 1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Administrative Level 2	600	110	54	26	49	25	49	25	49	25	25	25	25	113
Administrative Level 1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Hours	2,618	403	236	103	238	102	222	102	238	102	102	102	134	534

6.2 Subtask 2 Identify and Evaluate Neutralization Technologies

The results of Subtask 2 will provide in-depth and consolidated information on UXO neutralization technologies to enable the Government to identify data gaps in those technologies, and to better focus and direct future UXO RDT&E efforts. The final report will review the technical, ESOH and economic factors that impact the technology alternatives. The final report will also characterize potential paths forward for development, demonstration, and programmatic issues.

Subtask 2 Description

Subtask 2 is organized into five work units to accomplish the required objectives as depicted in Figure 10 and described below.

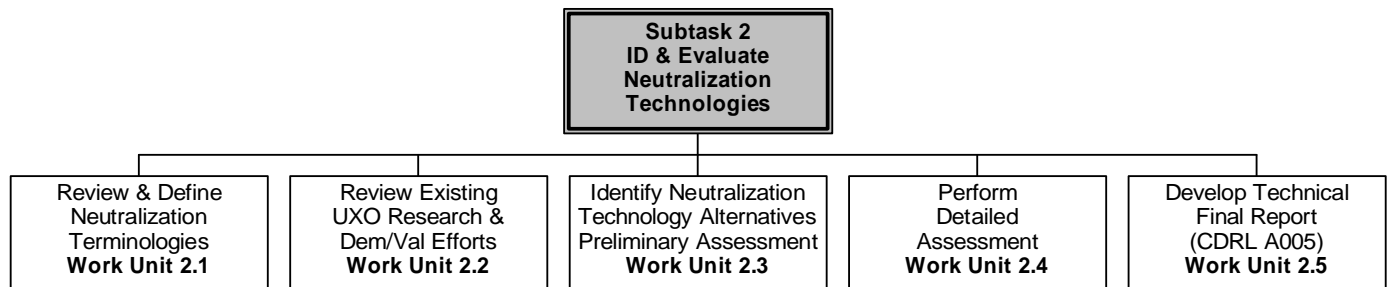


Figure 6. Subtask 2 WBS

The following provides an overview of the five work units:

- Utilizing the POCs, or Project Team, identified by the USAEC Technical Monitor, terminology associated with the various UXO “handling” categories will be reviewed to clarify and differentiate neutralization from remediation.
- Conduct comprehensive and in-depth literature searches, using electronic and hardcopy data and information sources, to identify current UXO neutralization technologies. Public and private sector organizations, electronic and hardcopy data and information repositories, technology developers/vendors, and other identified sources will be included in the search activities. The technical approach for the work unit will include: (1) preliminary information gathering will focus on searches of public and private sector libraries and repositories, identification of case histories, telephone interviews with technology developers/vendors and other identified sources, with special attention to collect point-of-contact (POC) information for technologies and case histories; (2) detailed information gathering will involve contacting POCs for each identified UXO neutralization technology or project to help

complete the case histories/technology reports, fill information gaps, answer specific questions, and to assess the amount of detailed information and data that is available for technical review and evaluation. Project Team members such representatives from the various branches of the military and NAOC will be contacted to gather information pertaining to current UXO neutralization demonstration/ validation efforts being conducted or supported by their various organizations; and, (3) data preparation and presentation will organize the information obtained during the previous steps into a matrix identifying for each technology the factors affecting implementation such as effectiveness, operation costs, safety issues, environmental impact, limitations, etc. This matrix will be summarized and presented to the Project Team and their feedback will serve as the screening baseline. This feedback will be solicited regarding how well the existing technologies meet the neutralization needs.

- Conduct a similar search to the previous step to identify emerging UXO neutralization technologies. This identification of technologies currently in the laboratory will involve approaching the DOD, federal laboratories, the private sector (especially SBIR/STTR Phase II winners), and universities. Because of the developmental stage of these technologies, some of the data available for currently used technologies in the previous step may not be available. A questionnaire will be developed, with concurrence from the Technical Monitor, to standardize input for each technology and allow comparison. A matrix gathering data based on the questionnaire for up to ten technologies will be presented to the Project Team and their feedback will serve as a preliminary assessment of technologies.
- Prepare a detailed assessment of up to five technologies. The relevant direct and indirect costs, activities and performance characteristics associated with each of the alternative technologies will be characterized. A detailed Environmental, Safety and Occupational Health Review of each of the Technology Alternatives will be performed. Based on all the information collected, a recommendation for the further development and/or demonstration needs, and associated, costs for each selected technology alternatives will be made.
- Prepare a summary Technical Report (CDRL A005) that presents the results of the subtask in a plain language format, but with the requisite technical detail, that will allow the Government to make better informed decisions concerning UXO neutralization technologies. The report will include all documentation

concerning terminology clarifications, a summary of all technologies identified in the preliminary assessment, outline those technologies selected for the detailed assessment, and the results of the detailed assessment, including, but not limited to, a description of the technology, its effectiveness, capabilities, and limitations, its most suitable application(s), case studies, cost benefit, certification(s), and any implementation considerations.

A strong requirement also exists for coordination with Subtask 3 Identify and Evaluate UXO Remediation Technologies, with special consideration for information sharing and collaboration during the clarification of neutralization and remediation terminology. Such coordination will be organized through regular monthly information exchange meetings between the teams performing work on both Subtasks, with additional exchanges as required.

The above work units as shown in the Subtask 2 WBS in Figure 10 are described in greater detail in Appendix A, Section A.2.

Subtask 2 Deliverable

Subtask 2 will involve documenting neutralization technologies that are used in the field, as well as those that are still at the laboratory development stage. The primary objectives of the subtask are to identify the current status of technology development, compare and contrast existing technologies, identify emerging technologies, and identify development needs related to the emerging technologies. In support of meeting the objectives of this subtask, NDCEE will prepare and develop a final summary report to document all data gathered and reviewed, the resulting evaluation of that data and subsequent recommendations. NDCEE will deliver to the Government the draft summary report in both hard copy and electronic format (Microsoft Word). After receipt and appropriate incorporation of Government review comments, NDCEE will deliver the final summary report to the Government in both hard copy and electronic format (Microsoft Word), in accordance with CDRL A005 for this Task.

The findings of this subtask will be documented in a technical report. The report will summarize effectiveness of existing technologies, compare and contrast existing technologies, and identify emerging technologies. The report will also include recommendations of those technologies requiring additional development and/or demonstration, with required funding estimate. Such estimates will be based in part upon prior knowledge gained by the Project Team and technology vendors during development of earlier technologies.

Subtask 2 Schedule

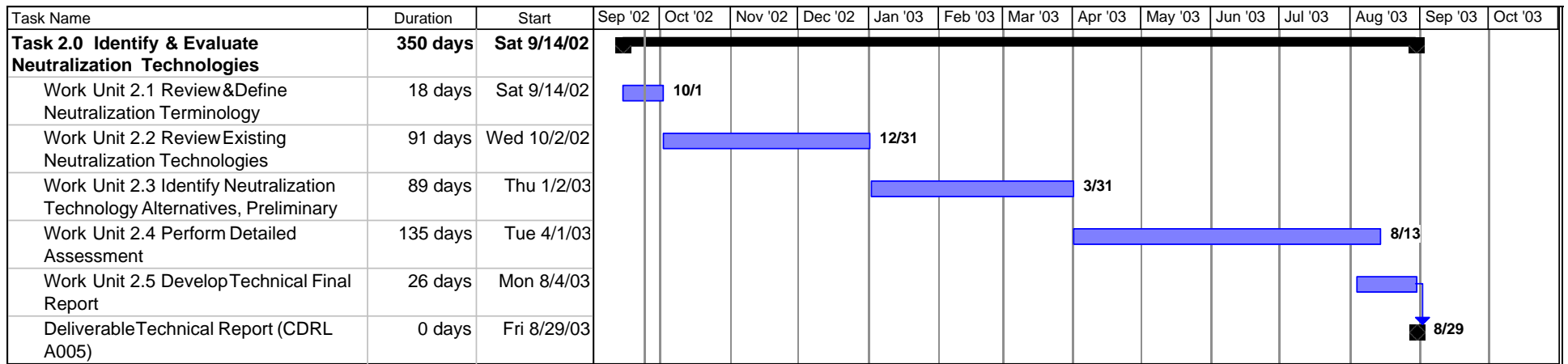


Figure 7. Schedule for Subtask 2 Identify and Evaluate Neutralization Technologies

Concurrent Technologies Corporation														
Contract No. DAAE30-98-C-1050														
Task 307														
Unexploded Ordnance - ID & Evaluate Neutralization Technologies Literature Review														
Description	Total Proposed	Sep-02	Oct-02	Nov-02	Dec-02	Jan-03	Feb-03	Mar-03	Apr-03	May-03	Jun-03	Jul-03	Aug-03	Sep-03
Level of Effort (Hours)														
Professional Level 5	528	40	32	31	29	48	45	45	28	28	28	28	30	116
Professional Level 4	643	8	45	45	44	49	76	79	41	41	41	41	43	90
Professional Level 3	187	0	10	14	14	13	13	15	22	23	22	23	4	14
Professional Level 2	140	8	32	32	24	22	22	0	0	0	0	0	0	0
Professional Level 1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Technician Level 3	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Technician Level 2	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Technician Level 1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Administrative Level 2	240	16	18	17	17	17	18	17	18	18	18	18	16	32
Administrative Level 1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Hours	1,738	72	137	139	128	149	174	156	109	110	109	110	93	252

Table 5. Resource Table for Subtask 2 Identify and Evaluate Neutralization Technologies

6.3 Subtask 3 Identify and Evaluate Remediation Technologies

The results of Subtask 3 will provide comprehensive, in-depth and consolidated information on state-of-the-art UXO remediation technologies, including remote and robotically operated technologies, to enable the Government to better focus and direct future UXO RDT&E efforts. The information will improve the Government's ability to remediate UXO sites more efficiently with respect to time and cost considerations and with reduced safety hazards to EOD personnel.

Subtask 3 Description

Subtask 3 is divided into five work units to accomplish the required objectives as depicted in Figure 14 and described below.

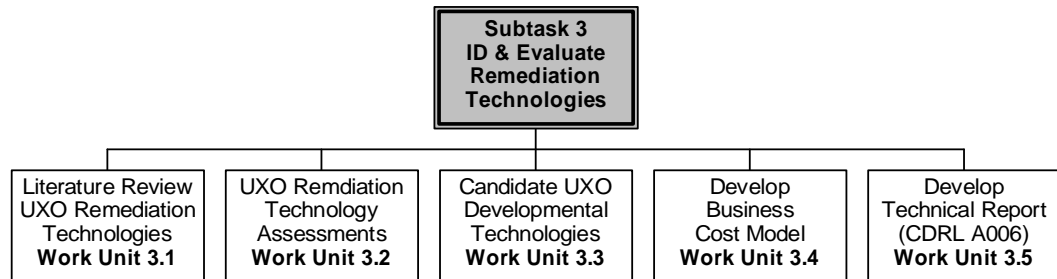


Figure 8. Subtask 3 WBS

The following provides an overview of the five work units:

- Conduct comprehensive and in-depth literature searches, using electronic and hardcopy data and information sources, to identify state-of-the-art UXO remediation technologies, including remote and robotically operated technologies. Public and private sector organizations, electronic and hardcopy data and information repositories, technology developers/vendors, and other identified sources will be included in the search activities.

The technical approach for the work unit will include: (1) preparation of an approach to the literature review that will delineate the proposed search strategy to ensure that stakeholder input and concurrence are included in the literature review process; (2) preliminary information gathering will focus on conducting the literature searches of public and private sector libraries and repositories, identification of technology case histories (successful/unsuccessful field projects or demonstrations, bench/pilot scale reports or evaluations) and point-of-contact (POC) information and telephone interviews with technology developers/vendors and other identified sources; (3) detailed information gathering will involve contacting POCs for each identified UXO remediation technology case history to

help complete and verify the information included in the case histories/technology reports, fill information gaps, answer specific questions, and to assess the quantity and quality of detailed information that is available for technical review and evaluation; and, (4) data preparation and presentation to organize the information obtained during the previous steps into tables and narrative summaries that will allow easy review and comparison of the identified technologies.

- Assess the identified UXO remediation technologies by evaluating technology-specific operational mechanisms, including safety, factors that affect implementation, site-or technology-specific capabilities, costs to operate or purchase, and the limitations, effectiveness and specific applications of each technology, in order to identify technologies that offer a safe and cost effective advantage to the Government over current practices.
- The technical approach for the work unit will include: (1) preliminary assessment of the collected case histories/remediation technologies information in terms of the quantity and quality of available data to identify UXO remediation technologies or case histories for detailed analysis; and, (2) detailed evaluation of the selected case histories/technologies to understand the science behind the technology, determine how specific characteristics influence technical and economic performance, and identify critical factors for transition to other sites.
- Identify and recommend (including funding estimates) remote and robotically operated UXO remediation technologies that warrant further development and/or demonstration.

The technical approach for this work unit will include: (1) use the results from the previous work unit to prepare a technology selection matrix that will cross-reference critical information on site conditions, UXO characteristics and technology types to enable preparation of a hierarchical listing of promising or emerging technologies; and, (2) prepare recommendations for two candidate technologies, including cost estimates, for further development and/or demonstration.

- Develop a simple business cost model to assess the cost effectiveness of identified technologies for deployment at other sites.

The technical approach for this work unit will include: (1) conducting a thorough review and evaluation of existing cost models, including the U.S. Army Cost Analysis Manual, DOE, CTC, and other cost models, as to their ability to compare cost, performance, efficiency and reliability issues of identified UXO remediation technologies; and, (2) developing modifications to existing models or developing a new model that considers site-specific factors, such as UXO characteristics, site characteristics, cost elements and regulatory drivers.

- Prepare a summary Technical Report (CDRL A006) that presents the results of the literature searches, technology evaluations and recommended candidate technologies in a plain language format, but with the requisite technical detail, that will allow the Government to make better informed decisions concerning remote and robotically operated UXO remediation technologies.

The technical approach for this work unit will include integrating the results of the previous work unit activities, Technical Monitor input and other information collected during work unit activities into a clear, concise and user-friendly document that provides a timely presentation of state-of-the-art UXO remediation technologies, including remote and robotically-operated technologies.

The above work units as depicted in the Subtask 2 WBS in Figure 14 are described in greater detail in Appendix A, Section A.3.

Subtask 3 Deliverable

Subtask 3 will initially involve conducting a literature search using existing government information and independent research to identify state-of-the-art technologies, including but not limited to remote and robotically operated technologies, to recover and remove UXO, and to recommend candidate technologies for further development and/or demonstration. In support of meeting the objectives of this subtask, the NDCEE will prepare a final summary report to document all the information gathered and reviewed, the results of the technology evaluations, technology recommendations for further development/demonstration, and a simple business cost model that will allow end users to assess the applicability of specific technologies for use at their sites. Because UXO neutralization and UXO remediation technologies may be closely related or may even overlap, close communication and coordination between Subtask 3 and Subtask 2 activities will ensure that duplication of effort in these subtasks does not occur. The draft summary report will be delivered to the Government in both hard copy and electronic format (Microsoft Word) for review and comment. After receipt and appropriate incorporation of Government review comments, the NDCEE will deliver the final summary report to the Government in both hard copy and electronic format (Microsoft Word), in accordance with CDRL A006.

Subtask 3 Schedule

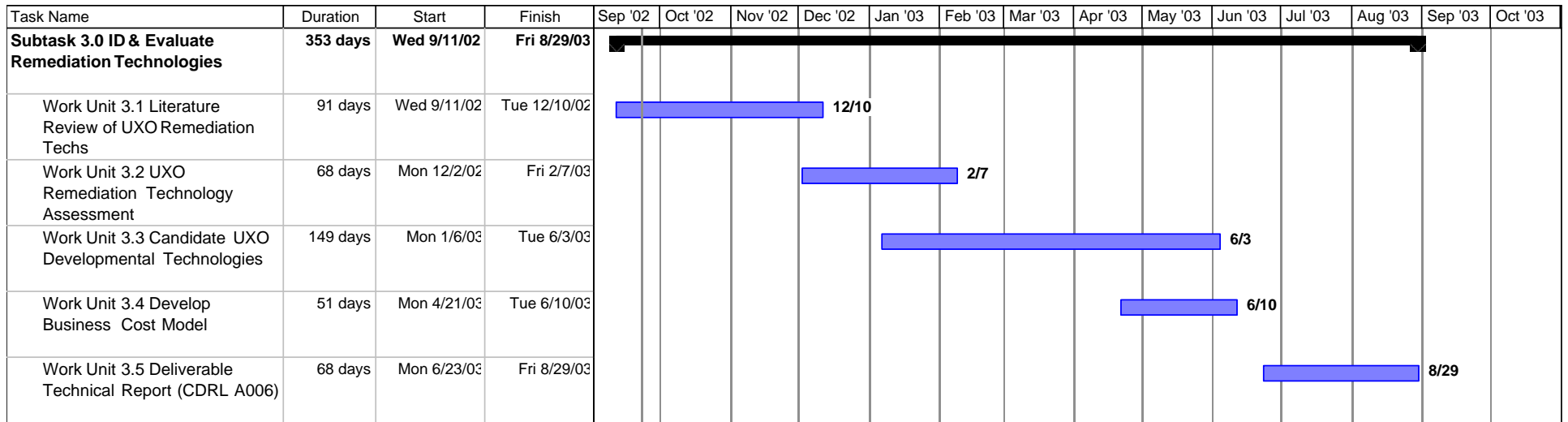


Figure 9. Schedule for Subtask 3 Identify and Evaluate Remediation Technologies

Table 6. Resource Table for Subtask 3 Identify and Evaluate Remediation Technologies

Concurrent Technologies Corporation														
Contract No. DAAE30-98-C-1050														
Task 307														
Unexploded Ordnance - ID & Evaluate Remediation Technologies														
Description	Total Proposed	Sep-02	Oct-02	Nov-02	Dec-02	Jan-03	Feb-03	Mar-03	Apr-03	May-03	Jun-03	Jul-03	Aug-03	Sep-03
Level of Effort (Hours)														
Professional Level 5	104	7	5	5	18	17	4	3	4	13	11	5	10	6
Professional Level 4	717	48	60	20	123	65	7	6	22	132	67	30	79	58
Professional Level 3	1,306	63	121	121	315	192	34	74	66	89	89	21	109	13
Professional Level 2	116	3	2	2	16	20	5	5	7	16	15	4	14	8
Professional Level 1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Technician Level 3	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Technician Level 2	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Technician Level 1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Administrative Level 2	173	5	6	6	20	30	6	7	9	19	15	6	32	12
Administrative Level 1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Hours	2,416	126	194	154	492	324	56	95	108	269	197	65	243	97

6.4 Subtask 4 Develop UXO Recovery Database

The results of Subtask 4 will provide adequate and readily accessible UXO and environmental information in an advanced UXO recovery database. The final database will be Internet based, easily searchable, and developed to be readily linked via the Internet to important UXO website addresses, such as the NDCEE, USAEC, and JUXOCO websites for all interested users. This will allow for improved Government decisions affecting the timeliness and cost-effectiveness related to OE restoration projects. The database can be used to evaluate and summarize important environmental and UXO information, which could improve predicting UXO recovery depths, making OE risk predictions, conducting OE sampling, as well as improving OE sweep efficiencies. By expanding the UXO recovery database and allowing easier accessibility to the data, the Government can gain an understanding regarding munitions historical penetration nature and use this enhanced understanding to identify the best UXO detection technology for restoration related projects.

Subtask 4 Description

Subtask 4 is organized into six work units to accomplish the required objectives as depicted in Figure 18 and described below.

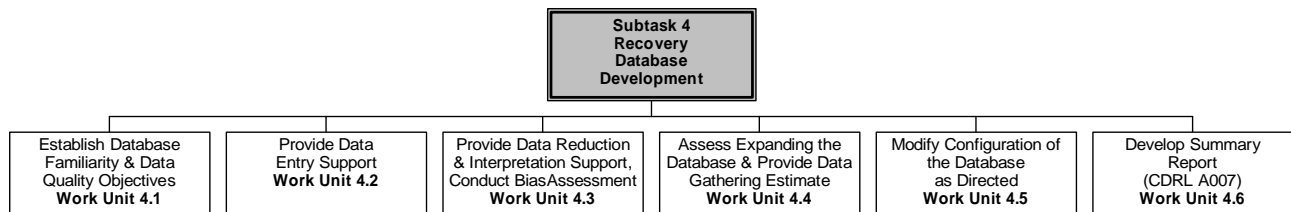


Figure 10. Subtask 4 WBS

The following provides an overview of the six work units:

- Establish familiarity with the Recovery Database and establish Data Quality Objectives for the task. The goal of this activity will assure that important aspects of the database are understood and that quality data is entered into the database in a manner that minimizes bias and promotes precision. Moreover, working closely with the developers of the database, this activity will assure that the most appropriate approaches for expediting the data entry process are selected as the data is obtained.
- Provide Data Entry Support. Placing all existing data into the UXO recovery database is the primary focus of this overall subtask. The goal of this activity is to assure that the appropriate methodology identified during the evaluation of the database is

implemented and that opportunities for continuous improvement regarding precision and efficiency are identified.

- Provide data reduction & data interpretation support, as well as conduct a bias assessment. The goal of this activity will be to provide expert review of data that supports the development of a scientifically defensible database through data reduction and interpretation of environmental data from relevant OE activities and sites (e.g., Formerly Used Defense Sites, Base Realignment and Closure and Installation Restoration Projects, and other related OE restoration projects). Working closely with the USACE, this activity will assure data are representative of the portion of the environment being investigated and that sample bias and data imprecision is minimized.
- Assess expanding the database and provide an estimate for gathering data on ordnance residue in holes. The goal of this activity is to assess and evaluate options to improve the database through expansion. This may include recommending the deletion or addition of categories of data currently in the database and making recommendations for improving the user interface and for expanding the types of sources that are used to obtain data for the database. NDCEE will consult with potential end-users of the database to obtain input on the desired data generated requirements to ensure useful and desired capabilities are recommended for improving the database. In addition, this activity will lead to the development of a cost estimate for the accurate gathering of data on contaminant residue in holes found at UXO restoration projects to improve decision-making processes related to evaluating UXO environmental risk at U.S. military installations.
- Modify configuration of the database as directed by the Government. The goal of this activity will be to improve the configuration of the UXO recovery database as directed by the government. Specialized support services will be planned for moderate configuration changes on the UXO recovery database and reserved until Government direction is provided through the appropriate contracting channels. It is currently envisioned that the final database will be Internet based, easily searchable, and developed to be readily linked via the Internet to important UXO websites, such as the NDCEE, USAEC and JUXOCO websites for all interested users.
- Prepare a summary report. The goal of this activity is to summarize recommendations for future data collection that improves precision and minimizes bias as well as recommend approaches for expediting the data entry process and expanding the products generated through the recovery database. In addition, the

summary report shall include an assessment of the inherent bias in the environmental data due to detection limitations and cleanup goals. The summary Technical Report (Database) will be submitted in accordance with CDRL A007.

The above work units as depicted in the Subtask 4 WBS in Figure 18 are described in greater detail in Appendix A, Section A.4.

Subtask 4 Deliverable

Subtask 4 is a data management and data entry support task using existing data and an existing database, along with specialized independent data interpretation support and environmental expertise to (1) promote the advancement of a UXO technical database, and (2) produce one summary technical report. In support of meeting the objectives of this subtask, NDCEE will prepare and develop a final summary report to document all data gathered, data entry techniques utilized, the new format developed, the data generated, and the calculated data bias. NDCEE will deliver to the Government the draft summary report in both hard copy and electronic format (Microsoft Word). After receipt and appropriate incorporation of Government review comments, NDCEE will deliver the finalized final summary report, including the link to the final database, to the Government in both hard copy and electronic format (Microsoft Word), in accordance with CDRL A007 for this Task.

Subtask 4 Schedule

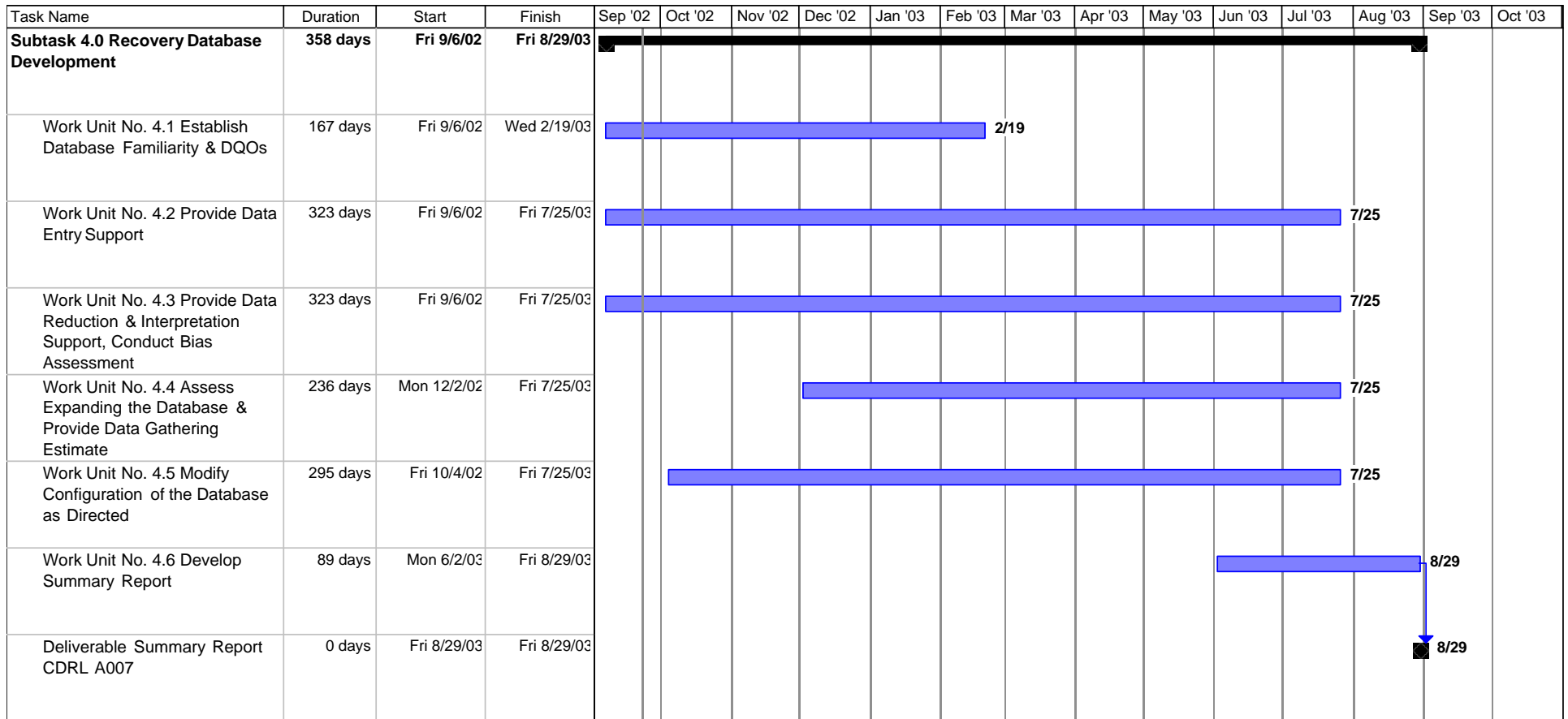


Figure 11. Schedule for Subtask 4 Develop UXO Recovery Database

Table 7. Resource Table for Subtask 4 Develop UXO Recovery Database

Concurrent Technologies Corporation Contract No. DAAE30-98-C-1050 Task 307 Unexploded Ordnance - UXO Recovery Database														
Description	Total Proposed	Sep-02	Oct-02	Nov-02	Dec-02	Jan-03	Feb-03	Mar-03	Apr-03	May-03	Jun-03	Jul-03	Aug-03	Sep-03
Level of Effort (Hours)														
Professional Level 5	26	1	2	2	3	3	3	2	2	2	2	2	0	6
Professional Level 4	565	1	44	45	58	58	59	42	42	42	42	52	40	44
Professional Level 3	735	12	56	74	76	76	76	66	66	66	66	56	20	25
Professional Level 2	357	0	38	36	44	44	44	29	29	29	29	35	0	0
Professional Level 1	912	0	44	94	102	102	102	94	94	94	94	92	0	0
Technician Level 3	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Technician Level 2	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Technician Level 1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Administrative Level 2	522	2	11	61	61	61	61	53	53	53	53	53	0	0
Administrative Level 1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Hours	3,117	15	195	312	343	344	345	285	285	285	285	289	60	75

6.5 Subtask 5 Develop Quality Control Protocols for UXO Technology Operators

As a part of Subtask 5, a stakeholder group focused on QC controls for UXO technology operators will be established to facilitate consensus building among the different services and their respective organizations for QC Protocols for UXO technology operators performing UXO detection and characterization activities. In particular, this subtask will result in the development of a QC protocol for ensuring proper training of UXO detection and characterization technology field operators. The protocol will be designed to ensure that the operators are properly trained to obtain the same level of performance in the field as was obtained during testing and demonstration of the technology by the developing engineers and scientists. A comprehensive technical report that outlines the recommended consensus approach, and subsequent stakeholder feedback regarding the recommended approach, will be made available for Government decision-makers regarding QC Protocols for UXO Technology Operators.

Subtask 5 Description

Subtask 5 is organized into five work units to accomplish the required objectives as depicted in Figure 22 and described below.

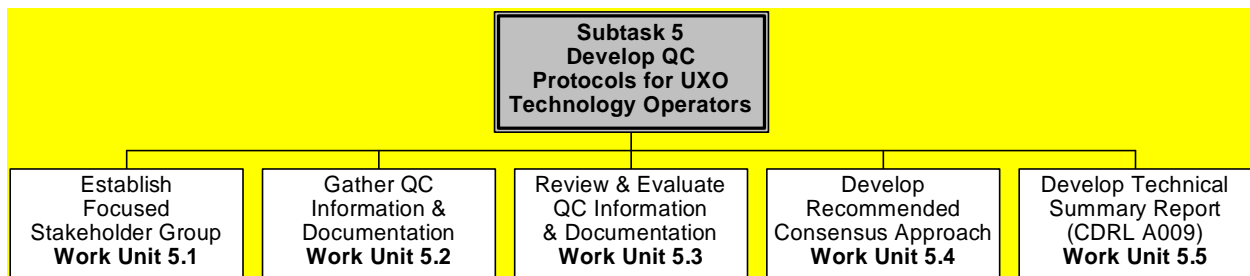


Figure 12. Subtask 5 WBS

The following provides an overview of the five work units:

- Utilizing the POCs identified by the USAEC Technical Monitor, individuals that manage, work, and/or delineate actions associated with UXO will be invited to join the Stakeholder Group.
- NDCEE will prepare an approach to the literature review that will delineate the proposed search strategy to ensure that stakeholder input and concurrence are included in the literature review process. It is the NDCEE's understanding that in the event that relevant and required protocols are not accessible within the public domain that these documents will be obtained and supplied to NDCEE by appropriately identified stakeholders. Preliminary information

gathering will focus on searches of public and private sector libraries and repositories, identification of existing protocols and documentation to assess the amount of information and data that is currently available for technical review and evaluation. In addition, identified personnel that are directly involved in the research, development, and acceptance of the aforementioned documentation will be interviewed to capture additional information, lessons learned, and insight into potential future efforts.

- All information collected as a result of work unit 5.2 will be documented, reviewed, and evaluated to determine its use and effectiveness. It is the NDCEE's understanding that the Stakeholder group will provide input regarding their own experience and use in dealing with any of the aforementioned documents.
- As appropriate, stakeholder teleconferences will be held to aid in the development of a recommended approach. In addition upon development of a draft approach, a teleconference will be conducted to discuss the draft recommended approach. Upon completion of the final recommended approach, a face-to-face Stakeholder meeting will be held, at a location designated by the Technical Monitor, for final Stakeholder review and comment.
- The final summary report for this subtask will include a complete list of the members of the stakeholder group, including the agencies/departments they represent, references for all documentation collected and reviewed, a summary of the evaluation of the information gathered, identified data gaps, lessons learned, and the recommended approach.

The above work units as depicted in the Subtask 5 WBS in Figure 22 are described in greater detail in Appendix A, Sections A.5.

Subtask 5 Deliverable

Subtask 5 will involve obtaining, reviewing, and evaluating all existing data, information, and QC protocols combined with independent research in an attempt to build an inter-service, consensus approach to a QC Protocol for UXO Technology Operators. Research will not only include reviewing and evaluating all QC documents that are currently available for UXO technology operators, but also will clarify the roles of the agencies providing the guidance in an effort to develop an all-agency encompassing approach to QC requirements for future application at UXO sites. A focused stakeholder group, consisting of individuals as identified by the Technical Monitor, will be established to aid in these efforts.

- Potential participants, as delineated by the USAEC Technical Monitor, will be invited to be active participants in a focused stakeholder group in support of this task. The goal will be to develop support and representation from all the services and their respective agencies that manage, work, or otherwise interact or delineate actions associated with UXO in the stakeholder group.

Working and coordinating with the QC stakeholder group, the NDCEE will evaluate the effectiveness of existing protocols. NDCEE will be provided all existing protocols and access to all relevant government personnel, including the Corps of Engineers personnel currently involved in the ESTCP Standardized UXO Test Sites Program. NDCEE will review all reports and interview relevant personnel concerning past, current, and potential future actions. To achieve the objectives of this subtask, NDCEE will prepare and develop a final summary report to document all data gathered, reviewed, and evaluated, data gaps identified, and definition of the proposed QC protocols for UXO Technology operators. In addition, the summary report will document efforts to obtain stakeholder consensus on the developed protocols including all comments as provided by the QC stakeholder group and efforts to remediate outstanding issues. NDCEE will deliver to the Government the draft final summary report in both hard copy and electronic format (Microsoft Word) within 420 DACA. After receipt and appropriate incorporation of Government review comments, NDCEE will deliver the finalized final summary report to the Government in both hard copy and electronic (Microsoft Word) format, in accordance with CDRL A009 for this Task.

Subtask 5 Schedule

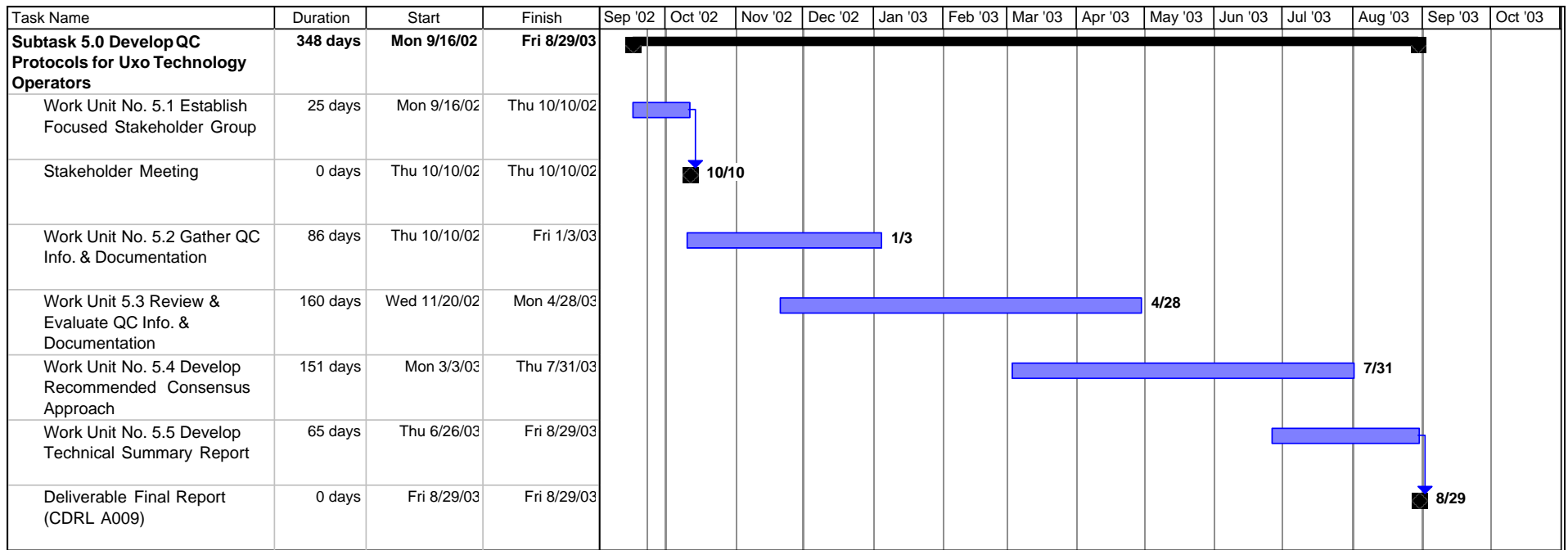


Figure 13. Schedule for Subtask 5 Develop QC Protocols for UXO Technology Operators

Table 8. Resource Table for Subtask 5 Develop QC Protocols for UXO Technology Operators

Concurrent Technologies Corporation Contract No. DAAE30-98-C-1050 Task 307 Unexploded Ordnance - Develop QC Protocols for UXO Technology Operators														
Description	Total Proposed	Sep-02	Oct-02	Nov-02	Dec-02	Jan-03	Feb-03	Mar-03	Apr-03	May-03	Jun-03	Jul-03	Aug-03	Sep-03
Level of Effort (Hours)														
Professional Level 5	202	4	18	20	28	0	8	16	22	8	17	35	26	0
Professional Level 4	132	0	8	0	22	0	0	8	28	8	16	28	14	0
Professional Level 3	416	0	12	20	34	10	56	56	64	22	44	56	42	0
Professional Level 2	86	0	16	40	17	8	1	0	2	0	0	0	2	0
Professional Level 1	1,883	88	136	106	138	100	100	212	193	140	165	305	200	0
Technician Level 3	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Technician Level 2	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Technician Level 1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Administrative Level 2	550	24	60	40	20	0	32	71	75	36	36	92	64	0
Administrative Level 1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Hours	3,269	116	250	226	259	118	197	363	384	214	278	516	348	0

6.6 Subtask 6 Land Use Controls as a UXO Response

The results of Subtask 6 will provide relevant information to DOD Components for use in making decisions affecting the timely and cost-effective implementation of LUCs as a UXO response.

Subtask 6 Description

Subtask 6 is organized into five work units to accomplish the required functions as depicted in Figure 26.

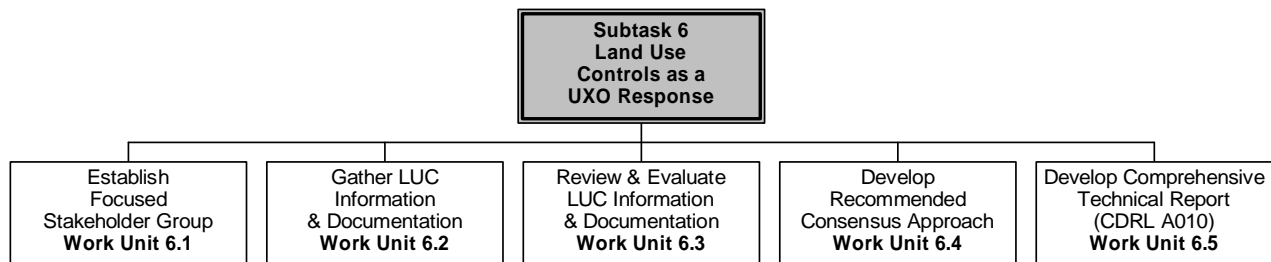


Figure 14. Subtask 6 WBS

The following provides an overview of the five work units:

- Assemble a Stakeholder Group consisting of POCs identified by the USAEC Technical Monitor.
- NDCEE will conduct a literature review to gather information on current methods of LUCs (physical, legal, or administrative), case studies of engineering and or institutional controls that have been implemented at DOD sites, requirements and impediments to implementation, and lessons learned.
- The data gathered will be evaluated to identify data gaps in the current knowledge base of engineering and institutional controls and failure analysis will be conducted to determine why breakdowns have occurred.
- A recommended consensus-based approach will be developed for use in implementing LUCs. Recommendations for further legislative restrictions that can be applied to locations where UXO presence has been identified will be provided.
- A Technical Report (Survey Report) will be prepared in accordance with CDRL A010. Included in this report will be a Technology Transfer Package that includes a consensus based approach to implementing LUCs.

The above work units as depicted in the Subtask 6 WBS in Figure 26 are described in greater detail in Appendix A, Section A.6.

Subtask 6 Deliverable

The purpose of Subtask 6 is to document the current state-of-the-art for engineering and or institutional controls intended to protect human health. For the purpose of this subtask, engineering controls include the installation of physical barriers or other means of limiting access to property. Some examples of engineering controls are:

- Posting signs
- Building fences
- Removal actions.

Institutional controls are legal or institutional mechanisms that limit access to or use of property, or warn of a hazard. An institutional control can be imposed by the property owner, such as use restrictions contained in a deed or by a government, such as a zoning restriction. Some examples of institutional controls are:

- Affirmative/negative easements
- Affirmative/restrictive covenants
- Equitable servitudes
- Notices (deeds and newspapers)
- Zoning
- Education constituents
- Permit requirements
- Regulatory agreements.

NDCEE's approach to accomplish this subtask will consist of performing a comprehensive survey of the current state-of-the-art for engineering and or institutional controls. The survey will include visits to DOD sites, literature reviews, telephone interviews, and face-to-face meetings with members of the project team, regulatory agencies, and other interested stakeholders. As part of the survey, NDCEE will determine the requirements for long- and short-term implementation of engineering and/or institutional controls, impediments to successful implementation; assess the effectiveness, and failures or shortcomings of existing controls and perform failure analysis. Based on the results of the survey, NDCEE will recommend if additional LUCs need to be developed and also determine if there is a need for legislation to amend/enforce institutional controls, such as deed restrictions, and projected future requirements.

Building upon its experience with LUCs, such as air sparging and classification exemption area at Camp Pedricktown, New Jersey, and knowledge of consensus

efforts, such as the Interim Final Management Principles for Implementing Response Actions at Closed, Transferring, and Transferred Ranges Report, which was developed jointly by DOD and EPA, NDCEE will use a consensus approach for implementation of LUCs with DOD, state and federal regulatory agencies, and other interested stakeholders. NDCEE will develop this consensus on a generic basis so that it can easily be made site specific. NDCEE will integrate experiences and information gained under Subtask 6 into a technology transfer package of the consensus approach.

The status of Subtask 6 will be presented at three IPRs to be held via teleconference with the UXO Project Team.

NDCEE will compile the resultant documentation and technology transfer package into a technical report. NDCEE will deliver to the Government the draft technical report in both hard copy and electronic format (Microsoft Word). After receipt and appropriate incorporation of Government review comments, NDCEE will deliver the final technical report to the Government in both hard copy and electronic (Microsoft Word) format, in accordance with CDRL A010 for this Task.

Subtask 6 Schedule

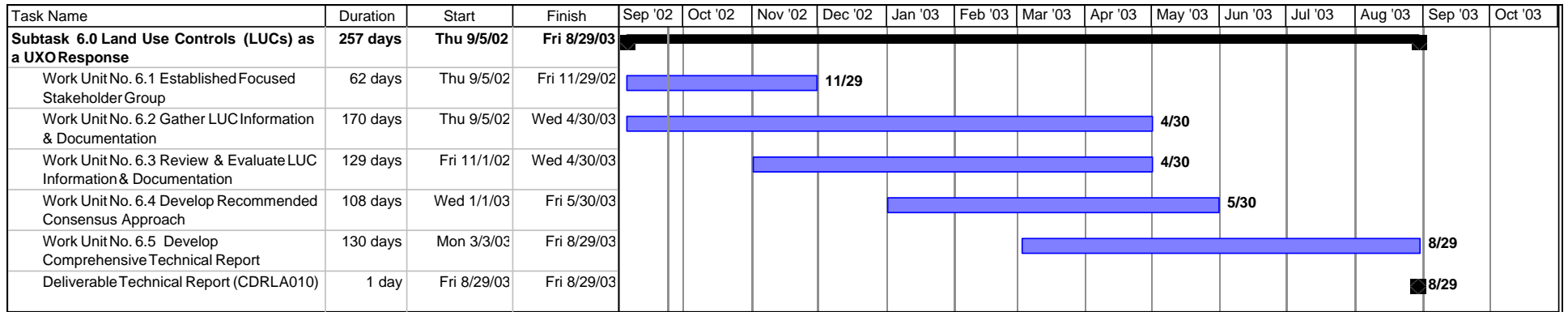


Figure 15. Schedule for Subtask 6 Land Use Controls as a UXO Response

Table 9. Resource Table for Subtask 6 Land Use Controls as a UXO Response

Concurrent Technologies Corporation Contract No. DAAE30-98-C-1050 Task 307 Unexploded Ordnance - Land Use Controls as a UXO Response														
Description	Total Proposed	Sep-02	Oct-02	Nov-02	Dec-02	Jan-03	Feb-03	Mar-03	Apr-03	May-03	Jun-03	Jul-03	Aug-03	Sep-03
Level of Effort (Hours)														
Professional Level 5	108	3	6	7	6	17	16	16	18	13	3	2	4	0
Professional Level 4	577	46	47	56	48	60	60	67	74	53	32	15	23	0
Professional Level 3	984	56	57	83	81	116	117	129	144	90	44	28	41	0
Professional Level 2	59	2	3	7	7	10	10	8	8	4	1	0	0	0
Professional Level 1	718	57	57	62	63	74	74	83	94	61	40	22	33	0
Technician Level 3	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Technician Level 2	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Technician Level 1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Administrative Level 2	110	2	3	6	5	9	9	13	18	14	11	9	14	0
Administrative Level 1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Hours	2,556	165	172	220	209	285	284	316	355	234	129	76	114	0

6.7 Subtask 7 Active Electromagnetic Induction (EMI) Effect on Electronic Fuzes

The results of Subtask 7, Active EMI Effect on Electronic Fuzes, will provide information to allow Government decisions affecting the areas of range safety, range clearance processes, range response planning, and procurement and research priorities for future equipment.

Range safety, response planning, and clearance processes are benefited from the acquisition of quantified data indicating which EMI field strengths may affect which fuzes. Understanding this may drive changes to clearance procedures, which provide a much safer working environment for military operations as well as contractors remediating contaminated sites. Research priorities and baselines may be affected by the data developed under this task on the myriad of projects currently funded by DOD to develop more efficient detection technologies. Procurement decisions may be affected by providing the DOD acquisition community with better data for selecting vendor offerings and if this data is shared with the vendors, it should also equate to better detectors being developed. Any best practices identified will be highlighted as they apply to DOD detection and clearance practices for the UXO detection.

Subtask 7 Description

Subtask 7 is organized into four work units to accomplish the required objectives as depicted in Figure 30.

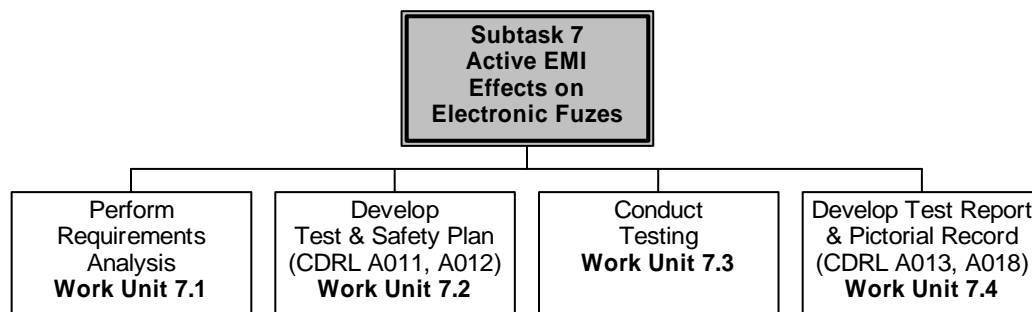


Figure 16. Subtask 7 WBS

The following provides an overview of the four work units:

- Conduct a Requirements Analysis to determine a baseline for testing of electronic fuzes for their susceptibility to EMI, through research, gap analysis of the knowledge base, identification of parameters, and creation of a test matrix.
- Develop Test and Safety Plans to ensure quality assurance and data validity and to ensure the safety of both personnel and equipment.

- Conduct scientific, repeatable, quantifiable, and is safe tests on pre-identified fuzes, which are suspected of being vulnerable to the effect of EMI emissions.
- Produce effective communication of the results of the EM/Electronic Fuze Testing Program in the formats conducive to meeting government needs to translate the data to the user community.

The above work units as depicted in the Subtask 7 WBS in Figure 30 are described in greater detail in Appendix A, Section A.7.

Subtask 7 Deliverables

An initial Internet search on this subject produced an indication that some work to determine the effect of EMI on fuzes has already been accomplished on older weapon systems in relation to higher levels of electro-magnetic energy. However, this data was not tested using EMI signatures similar to those produced by technologies currently fielded or planned specifically for UXO detection and characterization. Obviously, the same applies to similar technologies used to produce ground characteristic studies such as those used in environmental studies. Quantified information is needed in a format conducive to make recommendations concerning the use of detection equipment on potentially live fuzes whether still attached to unexploded ordnance or alone, as these devices present a thermal and explosive hazard even when not still attached to ordnance.

This first requirement to accomplish this task is the need to identify the data gaps (i.e., what is not known), which will be met by work unit 7.1, Perform Requirements Analysis. Filling those knowledge gaps will be accomplished by the second major work unit, testing. Identified gaps in the available data will be met by applying accepted scientific testing to fuze types that are identified as having the potential to be affected by EMI.

Subtask 7 is a research and testing task to produce a detailed technical report:

- EMI Affect on Fuzes, per CDRL A013

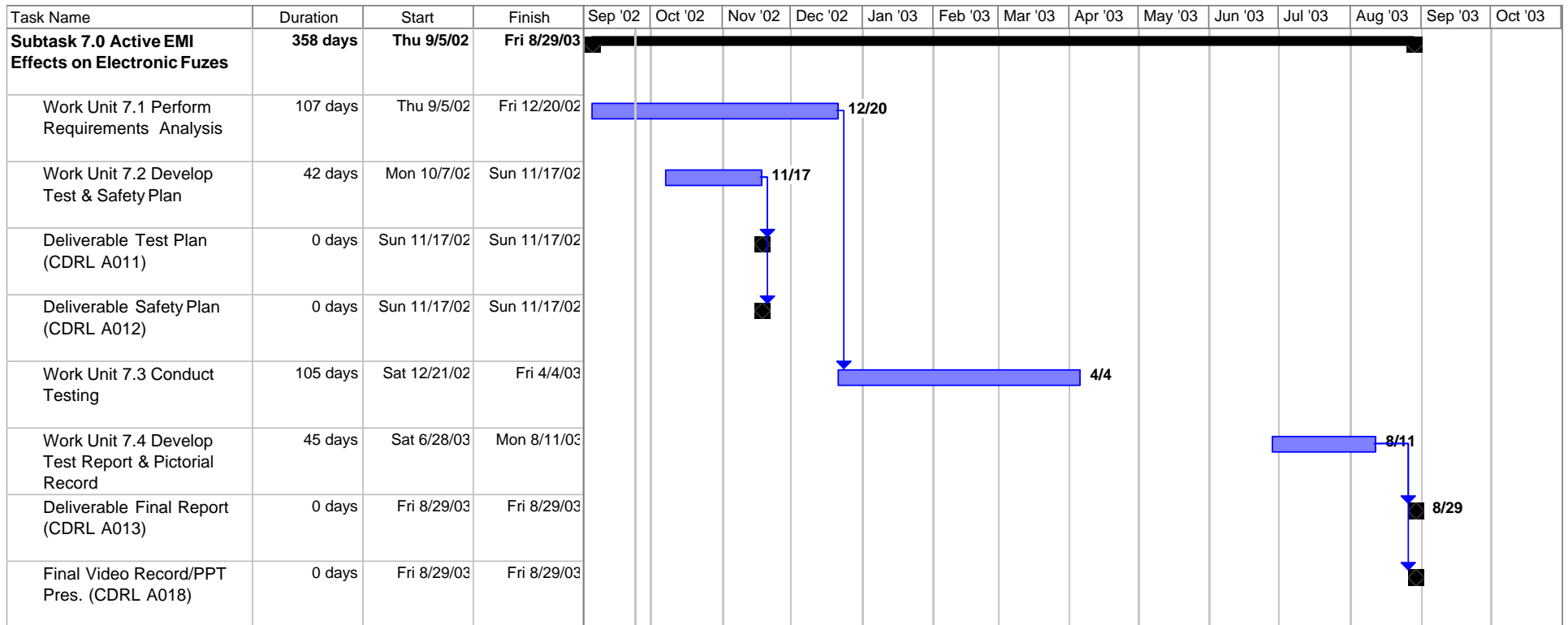
The information developed by this report and pictorial information gathered during the testing will be used to develop:

- Pictorial Record of EMI Testing Procedure, per CDRL A018
- EMI Affect on Fuzes Presentation, per CDRL A018.

In support of the testing, two plans will be necessary to ensure the safety of the program and the validity of the data:

- EMI Testing Plan, per CDRL A011
- EMI Testing Safety Plan, per CDRL A012.

Subtask 7 Schedule



Note: Per the Government's comments at the Kickoff Meeting, the delivery dates for the Test and Safety Plans may be adjusted to allow for greater research time.

Figure 17. Schedule for Subtask 7 Active EMI Effects on Electronic Fuzes

Table 10. Resource Table for Subtask 7 Active EMI Effects on Electronic Fuzes

Concurrent Technologies Corporation Contract No. DAAE30-98-C-1050 Task 307 Unexploded Ordnance - Active EMI Effect on Electronic Fuzes														
Description	Total Proposed	Sep-02	Oct-02	Nov-02	Dec-02	Jan-03	Feb-03	Mar-03	Apr-03	May-03	Jun-03	Jul-03	Aug-03	Sep-03
Level of Effort (Hours)														
Professional Level 5	135	20	20	0	0	0	0	0	3	24	24	24	0	20
Professional Level 4	2,193	280	365	80	90	85	0	10	150	250	208	240	220	215
Professional Level 3	1,459	196	143	80	100	80	60	40	40	40	90	210	180	200
Professional Level 2	72	4	4	2	2	2	0	2	2	2	2	2	44	4
Professional Level 1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Technician Level 3	500	0	0	0	0	0	0	0	40	140	160	160	0	0
Technician Level 2	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Technician Level 1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Administrative Level 2	400	20	60	20	20	20	0	20	20	20	20	20	84	76
Administrative Level 1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Hours	4,759	520	592	182	212	187	60	72	255	476	504	656	528	515

6.8 Subtask 8 Evaluation of UXO Migration

The results of Subtask 8 will provide information to allow DOD Site and Range Managers and Government decisions-makers to better understand the UXO migration. The utility of the data will be to develop a frost heave and heat heave susceptibility models/maps for cold-climate regions and warm-climate regions. The results will be used to validate the best existing model and help DOD Site Managers, Range Managers, and Government decision-makers in the determination of the required depth of UXO clearance.

Subtask 8 Description

Subtask 8 is organized into six work units to accomplish the required objectives as depicted in Figure 34.

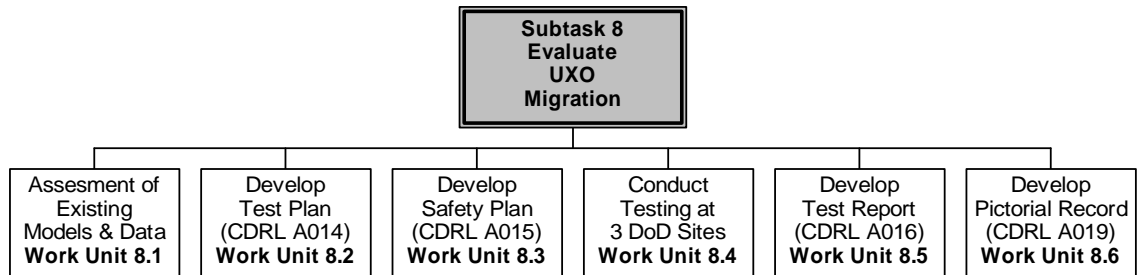


Figure 18. Subtask 8 WBS

The following provides an overview of the six work units:

- Conduct an assessment of applicable models, existing data, and recommended guidelines concerning UXO migration. This assessment will identify potential UXO migration parameters and allow for the development of a test matrix of parameters. Per the Government's directions during the Task Kickoff Meeting on 03 October 2002, the feasibility of using environmental chambers for conducting the UXO migration tests will be investigated.
- A Test Plan will be developed to ensure thorough preparation, quality assurance, and data validity. The Test Plan will be tailored to each site delineating the test execution process, ensuring appropriate data, meaningful data is collected, retained and archived with an emphasis toward validation of existing models.
- A Safety Plan will be developed and tailored to each site ensuring the safety of both personnel and equipment while meeting all local and DOD safety policies and procedures.
- Conduct scientific, repeatable, and quantifiable tests on inert UXO of differing sizes, shapes and composition at each test site. Each

piece of UXO will be fitted as appropriate with devices that will allow the monitoring of movement in varying temperature, soil and moisture conditions.

- A detailed technical report will be prepared on the findings at all test sites. The most promising applicable model will be validated using the data obtained from the test sites.
- An effective pictorial record will be maintained throughout the task to ensure each phase is thoroughly documented.

The above work units as depicted in the Subtask 8 WBS in Figure 34 are described in greater detail in Appendix A, Section A.8.

Subtask 8 Deliverables

Subtask 8 is a research task, using existing data and information combined with independent research, to produce technical data that will allow an assessment of UXO migration and movement toward the soil surface over time as a result of frost or heat heave (lifting). The test plan will describe the design of test plots and equipment to measure soil parameters contributing to frost heave and heat heave at the selected locations. The goal is to quantify the movement of buried UXO. The design will include methods to measure movement of buried UXO to coincide with freeze-thaw temperature cycles in cold-climate sites and heat-chill temperature cycles in a warm-climate site. Factors such as snow cover and vegetation will also be included in the test plan. Results from this study will quantify the frost heave and heat heave displacements of buried UXO and validate the best-available predictive model.

Subtask 8 Schedule

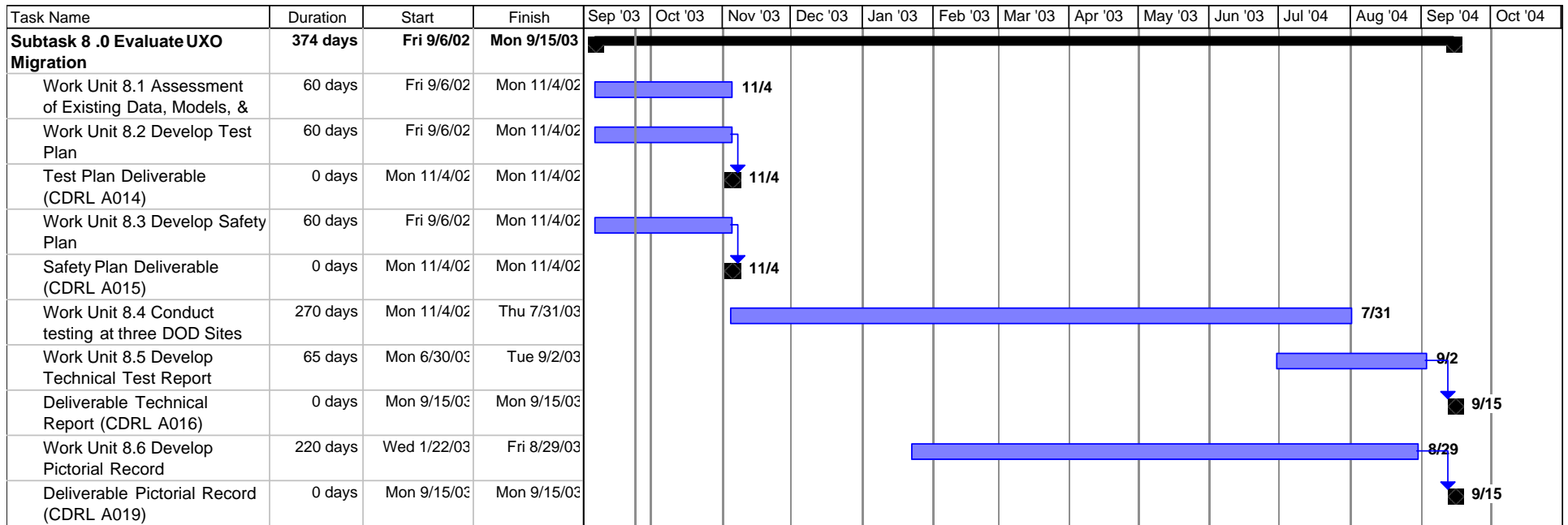


Figure 19. Schedule for Subtask 8 UXO Migration

Table 11. Resource Table for Subtask 8 UXO Migration

Concurrent Technologies Corporation Contract No. DAAE30-98-C-1050 Task 307 Unexploded Ordnance - Evaluation of UXO Migration														
Description	Total Proposed	Sep-02	Oct-02	Nov-02	Dec-02	Jan-03	Feb-03	Mar-03	Apr-03	May-03	Jun-03	Jul-03	Aug-03	Sep-03
Level of Effort (Hours)														
Professional Level 5	277	25	45	33	15	15	15	11	15	11	15	16	13	51
Professional Level 4	3,024	261	384	367	210	210	210	122	210	122	208	219	240	263
Professional Level 3	457	21	25	24	43	43	43	23	43	23	43	41	40	49
Professional Level 2	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Professional Level 1	133	14	19	12	7	7	7	2	7	7	7	9	11	24
Technician Level 3	700	0	40	144	136	0	0	0	0	0	0	144	200	36
Technician Level 2	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Technician Level 1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Administrative Level 2	538	40	48	54	38	37	36	31	36	31	36	41	43	67
Administrative Level 1	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total Hours	5,128	361	561	634	448	311	310	188	310	193	308	470	547	489

7.0 GOVERNMENT FURNISHED PROPOERTY AND ASSISTANCE

The Government will supply NDCEE with access to all relevant information, records, and documents necessary to accomplish the SOW. In addition, NDCEE will also have access to the required Government sites, including Government escorts, if applicable, to complete the testing requirements of the SOW.

The Government will supply NDCEE with all the electronic fuzes and EM detectors and associated equipment to be used for testing in Subtask 7: EMI Effects on Electronic Fuzes. The Government will also supply NDCEE with all the ordnance items to be used for testing in Subtask 8: Evaluate UXO Migration. In addition, personnel at the designated testing sites will be accessible to NDCEE personnel for approval of the test and safety plans and clearance for access to the testing sites in order to conduct all necessary actions associated with field testing for Subtasks 7 and 8, EMI Effect on Electronic Fuzes and UXO Migration, respectively. NDCEE will provide all additional necessary personnel, facilities, buildings and materials, except where identified otherwise, and provide the required expertise to conduct the work described in the SOW for this Task.

8.0 TESTING REQUIREMENTS

NDCEE will conduct all testing under this SOW in accordance with contractor-prepared, Government-approved test and safety plans. In addition, NDCEE will notify the Government Technical Monitor at least 5 business days prior to the start of testing.

9.0 INSPECTION, SUBMITTAL, AND ACCEPTANCE

Before submittal to the Government, *CTC* senior management will conduct a review of, critique, and approve of all deliverables, including reports and test data. Distribution of information generated in this project will employ the use of electronic mail, telephone conferences, and facsimile messages to keep all participants informed of progress while reducing environmental impact of the project. The final acceptance of the services and data deliverables called for herein and provided by the NDCEE will be by the Contracting Officer on the advice of the Defense Contract Command.

The release of any data, conclusions or information pertaining to the UXO task, any subtasks, and/or generated results, in any publication, briefing or public forum, will be submitted by the NDCEE for review and approval to the Government prior to such release.

10.0 HAZARDS INFORMATION

All electronic fuzes/explosives will be handled by qualified, certified personnel. All ordnance items that will be used for the UXO Migration subtask will be certified inert by the Government prior to being used for testing in support of meeting the requirements of that task.

11.0 SECURITY

Security requirements related to the UXO task, specifically those associated with the testing of the electronic fuzes have yet to be determined and will be designated and clarified by the Government.

12.0 PROJECT RISK ASSESSMENT/PROJECT RISK MANAGEMENT

The following section qualitatively details the processes required to ensure that this project will proactively aim to reduce, minimize, or eliminate project risk. A large part of effective risk management is the acknowledgement that each project has certain risks, or uncertainties associated with it, which may affect the project in ways that cannot be specified in advance. It is important to attempt to identify the risks, and understand and accept risks that are inherent in the project, as well as prepare for responding to risk. This risk assessment/management plan qualitatively identifies and documents risk that may occur throughout the project, and documents the procedures that will be used to manage the risk (plan for contingencies). It also presents, where appropriate, who will be the responsible party for risk management activities.

This risk management plan is broadly framed based on the needs of this project. The plan is provided to minimize events that threaten the project and directed to satisfy quality management elements. Specifically, this risk management plan will cover who is responsible for managing various areas of risk, how the risk identifications will be maintained, and how contingency plans will be implemented. The following describes specific items of interest that were considered to minimize project risk.

The UXO Project Manager will be ultimately responsible for identifying, documenting, and effectively responding to project risk. The UXO Project Manager, when necessary, will delegate risk identification and risk responsive measures to appropriate assistant project managers, subtask leads, and/or other responsible persons.

This project can be considered a project of “moderate” risk. That is, the project management team has consciously decided to accept risk and risk events associated with routine project activities. The following can be considered reason for this project to be considered moderate risk:

- The project team has an established relationship with the Government organization.
- The project team is familiar with completing technically complex projects.
- The project team is familiar with completing administratively complex projects.
- The project team has access to needed resources to complete the project.
- The project team believes this project is not in a state of a “hot” regulatory climate.
- The project team believes that an unacceptable exposure to liability does not exist.

Even though the project risk is moderate, events that can have a critical effect on the viability of the project will be monitored carefully. Project threats that require attention during project management activities that may escalate the project to high risk include the following:

- Expansive decisions that go beyond project scope, budget, and schedule.
- Limiting budgets for project completion related to fieldwork and testing (Tasks 7 and 8 and related Work Units).
- Costly problems imposed on the project by unforeseen external forces.

In the event of an unacceptable risk, or contingency the following are pre-defined action steps to be taken by the project team to minimize risk and maintain project viability:

- Identify project change
- Analyze the effects of the change
- Develop a response strategy
- Communicate the strategy and gain endorsement for the change
- Revise the Project Management Plan/Work plan and monitor the effects of the change.

Table 21 further identifies the risks associated with this Task, in addition the level of risk is detailed and action for response and communication are also outlined.

Table 12. Project Risk Assessment/Risk Management

No.	Risk Identification	Risk Quantification	Risk Response	Risk Communication
1.	Budget/Financial Performance Risk – Funds were not identified for Government UXO Agencies that are vital for the successful completion of this task.	Moderate Risk	The Government and the NDCEE are working to clearly identify the support required from the Government UXO Agencies to	Problems/successes will be reported as they occur through biweekly calls with the project/stakeholder team. In addition, they will be documented through monthly reports, IPRs, and final reports.
2.	Information Gap Risks -- Access to Government supplied reports, documentation, and information, personnel and test sites are required.	Moderate	The Government's Technical Monitor for this task has established relationships with relevant Government UXO organizations. NDCEE must work to establish these relationships.	The Government Technical Monitor is to provide to the NDCEE a list of potential stakeholders/contacts, and NDCEE will work to develop appropriate relationships. A log of all information requests will be maintained to outline materials/access requested, agency responsible, and agency POC. In addition, receipt of materials/access or refusal of cooperation will be reported to the PMt and then subsequently to the TM.
3.	Project Risks -- Technically complex subtasks exist.	Moderate for Subtasks 7 & 8. Low for remaining Subtasks.	The project team is familiar with completing technically complex projects. The amount of significant and transferable data obtained for Subtask 8 is dependant on the weather (freeze/thaw cycles) that actually occurs during the test period.	Problems/successes will be reported as they occur through biweekly calls with the project/stakeholder team. In addition, they will be documented through monthly reports, IPRs, and final reports.
4.	Schedule Risks – Schedule risks exist.	Moderate for Subtasks 7 and 8. Low for remaining Subtasks.	NDCEE is working to quickly establish the necessary relationships with the Government agencies required to successfully complete Subtasks 7 and 8.	Problems/successes will be reported as they occur through biweekly calls with the project/stakeholder team. In addition, they will be documented through monthly reports, IPRs, and final reports.

Table 21. Project Risk Assessment/Risk Management (Continued)

No.	Risk Identification	Risk Quantification	Risk Response	Risk Communication
5.	Project Risks – This is a large task with multiple subtasks resulting in an administratively complex project.	Low	The project team — in particular the project management team — has the knowledge, experience, and track record for successfully completing administratively complex projects.	Problems/successes will be reported as they occur through biweekly calls with the project/stakeholder team. In addition, they will be documented through monthly reports, IPRs, and final reports.
6.	Regulatory Risks --Regulatory climate, control, and consideration risks exist.	Low	The required work/testing outlined within this Task will be accomplished within the auspices of all necessary certified DOD personnel.	Problems/successes will be reported as they occur through biweekly calls with the project/stakeholder team. In addition, they will be documented through monthly reports, IPRs, and final reports.
7.	Personnel Risks – Personnel/Staff changes	Low	The PMt has authority to ensure time allocations for team members are available. In addition, each subtask lead is responsible for assuring their teams are available for their allotments. Additional team members will be identified as the task is executed. All documentation, including monthly reports and meeting minutes, are maintain on the task level in order to minimize information loss as a result of staff turnover	Problems/successes will be reported as they occur through biweekly calls with the project/stakeholder team. In addition, they will be documented through monthly reports, IPRs, and final reports.

Table 21. Project Risk Assessment/Risk Management (Continued)

No.	Risk Identification	Risk Quantification	Risk Response	Risk Communication
8.	Deliverable Risks -- Planned tasks not completed on time due to one of the aforementioned.	Low/Moderate	Maintain development team composition throughout task execution and use risk management concepts to anticipate any problems with potential schedule affects.	Problems/successes will be reported as they occur through biweekly calls with the project/stakeholder team. In addition, they will be documented through monthly reports, IPRs, and final reports.

13.0 ISO/EHS DOCUMENTATION

Quality Assurance for this program will be accomplished in accordance with *CTC*'s internal ISO 9000 and ISO 14000 procedures. The table below lists the identified internal and external references identified for use in this project.

Table 13. ISO/EHS Documents

Title	Publication Date
<i>CTC</i> Project Management	11/26/01
<i>CTC</i> Procurement Manual	3/00
<i>CTC</i> Property Manual	3/99
<i>CTC</i> Control of External Documents	2/6/02
<i>CTC</i> Control of Local Documents	6/7/02
<i>CTC</i> Client Supplied Property	4/24/02
<i>CTC</i> Deliverable Documents	4/11/02
<i>CTC</i> Control of Measuring and Test Equipment	5/31/02
<i>CTC</i> Receiving Inspection	4/24/02
American National Standard Practice for Occupational and Educational Eye and Face Protection	1/1/89
Control of Hazardous Energy	2/13/96
Electrical Safety Work Practice	7/1/98
Hazardous Communication Standard	2/3/96
Job Hazard Analysis	1/1/92
Model for Quality Assurance in Design, Development, Production, Installation, and Servicing - ISO 9001: 1994	8/1/94
Personnel Protective Equipment for General Industry	7/1/98
Statistics for Experimenters: An Introduction to Design, Data Analysis, and Model Building	1978
<i>CTC</i> Client Surveys	1/4/02

APPENDIX A
Detailed Descriptions of Technical Subtasks

APPENDIX B
UXO Task No. 307 SOW, dated July 12, 2002
and
Contract Data Requirements Lists (CDRLs)

APPENDIX C
List of Personnel

Name/Organization	Background Description
Project Manager (CTC)	<p>Responsible for the leadership and management of large, complex tasks and company operations in the areas of Treatment and Remediation, Process Engineering and Systems Engineering. He also has a leadership role in support of the National Defense Center for Environmental Excellence (NDCEE) and CTC's Environmental Remediation Services initiatives. He is the Program Manager for the CTC tasks to achieve environmental regulatory closure of the U. S. Army BRAC sites at Rio Vista and Camp Pedricktown. CTC is the Prime Contractor for these tasks and regulatory closure of Rio Vista was achieved on January 22, 2002. He is also the Principal Investigator for the CTC task to evaluate UXO Detection and Characterization technologies. With over 30 years of experience in program and project management, plant and system design, installation, startup testing, troubleshooting and operations in the environmental, manufacturing, nuclear and chemical areas. He has a B.E. in Chemical Engineering, an EMBA and is a Registered Professional Engineer.</p>

Name/Organization	Background Description
Subtask 7 Lead (CTC)	<p>Has over 20 years of experience with Unexploded Ordnance. With over 10 years as an instructor for UXO Identification, Marking, Reporting, and Disposal. He has developed curriculum for classroom, field, and senior leadership UXO courses. He has developed several UXO Guides for troops to use in the field, based on the “Order of Battle” for the theater involved. He developed procedures for Improvised Explosive Devices and Nuclear, Biological, or Chemical materials. He has hands-on, operational experience with UXO in the field and has developed, scripted, and orchestrated numerous exercises involving UXO. While on active duty, he was a recognized expert in emergency response to Weapons of Mass Destruction/Anti-Terrorism and participated in the emergency response planning for the Atlanta Olympic Games. He developed the first Air Force-wide planning template for emergency response to WMD and is certified under Department of Justice in WMD Response. He is very familiar with the Resource Conservation and Recovery Act and the Range Rule disparities between the legislation and the Department of Defense. He is a nationally certified Hazardous Materials Emergency Response Incident Commander and Technician Instructor.</p>

Name/Organization	Background Description
Government Stakeholder	<p>Holds a B.S. in Biological, Agricultural and Soil Sciences, a M.S. in Soil Science, and a Ph.D. in Civil and Environmental Engineering from the University of Wisconsin-Madison. His technical expertise includes Research, Demonstration, and Validation of Unexploded Ordnance (UXO) Detection, Classification, Discrimination, Confirmation, and Remediation Technologies (DCDCRT). He demonstrates technical feasibility and performs cost-benefit and economic feasibility analyses for evaluating innovative environmental technologies including the technologies that fall under novel UXO/mine techniques or that can be developed further to become UXO remediation techniques. He has extensive knowledge and “hands on” experience in designing field studies such as the UXO migration Subtask at hand, including “hands on” knowledge in using different probes and sensors in the field to measure soil temperature, soil moisture, soil-moisture potential, displacement of objects in the subsurface, etc.</p> <p>Attends Department of Defense (DOD) Stakeholders meetings and workshops on Joint Multipurpose Wide Area UXO Test Sites. He collaborates with the stakeholders to leverage ongoing efforts by Strategic Environmental Research and Development Program (SERDP), Joint Unexploded Ordnance Coordination Office (JUXOCO), and Environmental Security Technology Certification Program (ESTCP). He presented on the subject of “Assessment, Demonstration, and Implementation of Innovative Technologies for UXO Detection at Formerly Defense Sites (FUDS) and Base Realignment and Closure (BRAC) Commission sites.”</p>

Name/Organization	Background Description
Technical Advisor (CTC)	<p>He plays a lead role in the identification, development, implementation, and management of projects with a focus on technical and environmental programs. His current emphasis is on identification, evaluation, and execution of programs related to military research, development, test, evaluation, and training range operation and sustainment, including UXO detection, characterization, and remediation technologies. He is trained as a Biologist/Biochemist with more than 32 years experience in conducting and managing research programs that address critical technical issues faced by the military as well as the private sector. He established the first environmental research program in the Air Force to deal with the environmental consequences of test, evaluation, training, combat use, and disposal of air-delivered weapons. He has long played a leadership role in increasing the sensitivity of the DOD to the requirements of environmental statutes and regulations and has served on a number of military task forces established to deal with their implementation. Especially noteworthy are his roles as: the Principal Air Force member of a Joint Service Panel to develop environmentally acceptable disposal procedures for the national stockpile of conventional munitions; as Chairman of a multi-agency group responsible for medical and environmental evaluation of depleted uranium as kinetic energy penetrators; and as the senior official to increase technical focus on technology developments to deal with UXO and mines likely to be encountered by deployed combat forces. He also served as the Program Manager for development of a ground penetrating radar system to meet UXO detection and discrimination requirements of the Air Force. Recently he served on the Operational and Environmental Executive Steering Committee for Munitions and played a lead role in preparation of the DOD Munitions Action Plan. Prior to joining CTC, he was the Deputy Director of the Air Force Air Expeditionary Forces Technologies Division with technical and managerial oversight of 200 government and contract employees involved in executing a multi-million dollar research and development program to support deployed combat forces.</p>

Name/Organization	Background Description
Technical Advisor (CTC)	<p>He is responsible for providing technical and management leadership to six major projects, including Advanced Distributed Learning, De-manufacturing of Electronic Equipment for Reuse and Recycling, Corrosion Measurement and Control, Non Hazardous Solid Waste deconstruction and demolition; all operated for the Department of Defense, and the Environmental Technology Verification of Pollution Prevention Technologies operated for the Environmental Protection Agency. He holds a B.S. in Electrical Engineering (Honors) from Johns Hopkins University and a M.S. in Metallurgy and Materials Science from Lehigh University. With more than 20 years of Manufacturing Engineering and Design and R&D experiences with Western Electric, Sandia National Laboratories and Lockheed Martin Corporation include electronics design and testing, corrosion control, organic and inorganic finishing, environmental control, technology transitioning and the demonstration, validation and implementation of new UXO and environmental remediation technologies. He participated as a member of Lockheed Martin's Advanced Environmental Systems' (LMAES) UXO project team and was involved in UXO remediation efforts at DOE's Idaho National Environmental Laboratory site and as a member of the LMAES Kaho'olawe UXO proposal team. For that project, he was responsible for identifying the various technologies associated with UXO remediation, which applied to ground and aerial detection, ordnance disposal, and UXO site command control.</p>

Name/Organization	Background Description
Subtask 5 Lead (CTC)	<p>She is responsible for a variety of project management tasks, including maintaining budgets and schedules, organizing meetings, and preparing and executing test plans, including the procurement of materials and subsequently the development of the final test reports. Within the Environmental Assessment group, she performs environmental and occupational health Risk Assessments and provides technical support through statistical analysis of environmental data and quality assurance reviews. As a result of these tasks, she has extensive experience in data collection and evaluation. She holds a B.S. in Geo-Environmental Engineering from the Pennsylvania State University and is currently enrolled in a Geographic Information System (GIS) Certificate Program for ESRI's Arc View Software. She has experience in researching UXO detection and characterization technologies to best meet environmental, operational, and UXO consideration criteria.</p>
Subtask 1 & 4 Lead (CTC)	<p>He is responsible for technical support and direction in all aspects of risk sciences related to environmental projects. He defines risk assessment objectives and implements project-specific methodologies consistent with the risk assessment paradigm. He performs numerous technical tasks and provides technical direction to staff for conducting data evaluations and data interpretation, managing environmental databases, completing exposure/toxicity/risk assessments, carrying out risk calculations, working with Federal, State, and DOD personnel on environmental tasks, and writing reports. He holds a B.S. in Biology from the University of Pittsburgh and a M.S. in Environmental Science and Management from Duquesne University. He is also a Certified Hazardous Materials Manager (CHMM). He is responsible for the technical aspects of the Army Rio Vista BRAC site closure task, which achieved regulatory closure on January 22, 2002. He also has experience in researching UXO detection and characterization technologies with his expertise having a special emphasis in the use of K-9 technologies for humanitarian de-mining. His database management experience includes acting as a key team member responsible for envisioning, developing, and expanding both the Toxicology Excellence for Risk Assessment's (TERA's) award-winning International Toxicity Estimates for Risk (ITER) database, and CTC's UXO-Detection and Characterization Expert System (UXO-DCES) Database.</p>

Name/Organization	Background Description
Subtask 3 Lead (CTC)	<p>He develops and manages technical projects that include investigation, assessment, and remediation of hazardous and toxic compounds at contaminated sites to meet risk-based cleanup standards; geographic information system (GIS) programs for information analysis, data evaluation, and technical or environmental management; assessment and redevelopment plans for Brownfield sites; and, pollution prevention programs for commercial, industrial and manufacturing facilities. He is the Technical Manager for development of a risk-based closure plan for selected work centers at the Tobyhanna Army Depot and an innovative cleanup approach that combines physical particle separation and stabilization to reduce soil lead concentrations at the Fort Dix small arms firing range. He holds a B.S. and a M.S. in Geology from Virginia Polytechnic Institute and State University and is a licensed geologist in the states of Arizona, Pennsylvania, and Virginia. He is a Certified Professional Geologist by the American Institute of Professional Geologists and a Certified Hazardous Materials Manager (CHMM) by the Academy of Hazardous Materials Managers. He currently is an active member of the Interstate Technology Regulatory Council (ITRC) UXO-OE Working Group (Geophysical Prove Out and Historical Records Review teams) and the ITRC Small Arms Team (SMART) Working Group, has directed rehabilitation and maintenance projects at active DOD small arms firing ranges in New Jersey, has experience researching and evaluating UXO detection technologies, and has conducted UXO investigation, assessment and removal projects in New Mexico and Montana.</p>
Subtask 2 Lead (CTC)	<p>He manages the activities of process engineers involved in various technology demonstration and validation efforts. He is also an accomplished project manager, currently managing technical projects in varied areas, ranging from corrosion protection of ordnance to evaluation of new laser-based metallic surface modification technologies. He has experience in the evaluation of new and emerging technologies to meet specific goals. He holds a B.S. in Mechanical Engineering from the Ecole Nationale Supérieure d'Arts et Métiers in Paris, France. He also holds a M.S. in Mechanical Engineering and a Ph.D. in Materials Science and Engineering, both from Clemson University. He has experience in researching the applicability of various radar-based technologies to locate and identify UXO.</p>

Name/Organization	Background Description
Subtask 8 Lead (CTC)	<p>He is the Manager of Southwest Operations for CTC. He is responsible for the oversight of each project delivered from the San Diego office. He has an extensive military background, serving as the head of the Engineering Department on five different U.S. Navy ships. He has an Associate of Applied Science degree in Air Conditioning Technology, a Bachelor of Technical Education degree, and a Master of Arts degree in Public Policy from Trinity College in Hartford, CT. He was a certified Force Protection/Anti-Terrorism Principal Advisor while on active duty. He was the certifying authority on explosive detection canines the Naval Submarine Base, New London, CT. while serving as the base Security Officer and Director of Public Safety. These canines were frequently used in support of presidential visits in the Northeastern United States. He served on various shipboard nuclear weapons safety councils and committees, as well as shipboard safety councils and committees. He is experienced in working with the Federal Bureau of Investigation (FBI), the Naval Criminal Investigative Service (NCIS), Federal Emergency Management Agency (FEMA) and other state and federal agencies.</p>
Subtask 6 Lead (CTC)	<p>He is responsible for managing a staff of 21 scientists, engineers, technicians and administrative support personnel. In addition to his personnel management responsibilities, he also manages projects, which include a \$2.8 million environmental remediation project at the Army BRAC site at Camp Pedricktown, New Jersey, and a \$4.3 million environmental monitoring and pollution prevention project at Radford Army Ammunition Plant, Virginia. In the course of remediating the Camp Pedricktown site, magnetometer surveys were conducted to detect the presence of unexploded ordnance prior to performing soil excavation activities. Land use controls, both engineering (air sparging) and institutional controls (classification exception area designation), were also used at Camp Pedricktown as part of the remediation effort. He is a Registered Environmental Manager (REM) and a Certified Hazardous Materials Manager (CHMM) with over 20 years of experience in the environmental field. He is also certified in the comprehensive practice of Industrial Hygiene (CIH) and has extensive knowledge of occupational safety and health regulations. He holds a B.S. in Terrestrial Ecology from the University of Pittsburgh at Johnstown and a M.S. in Environmental Engineering from the University of Florida.</p>